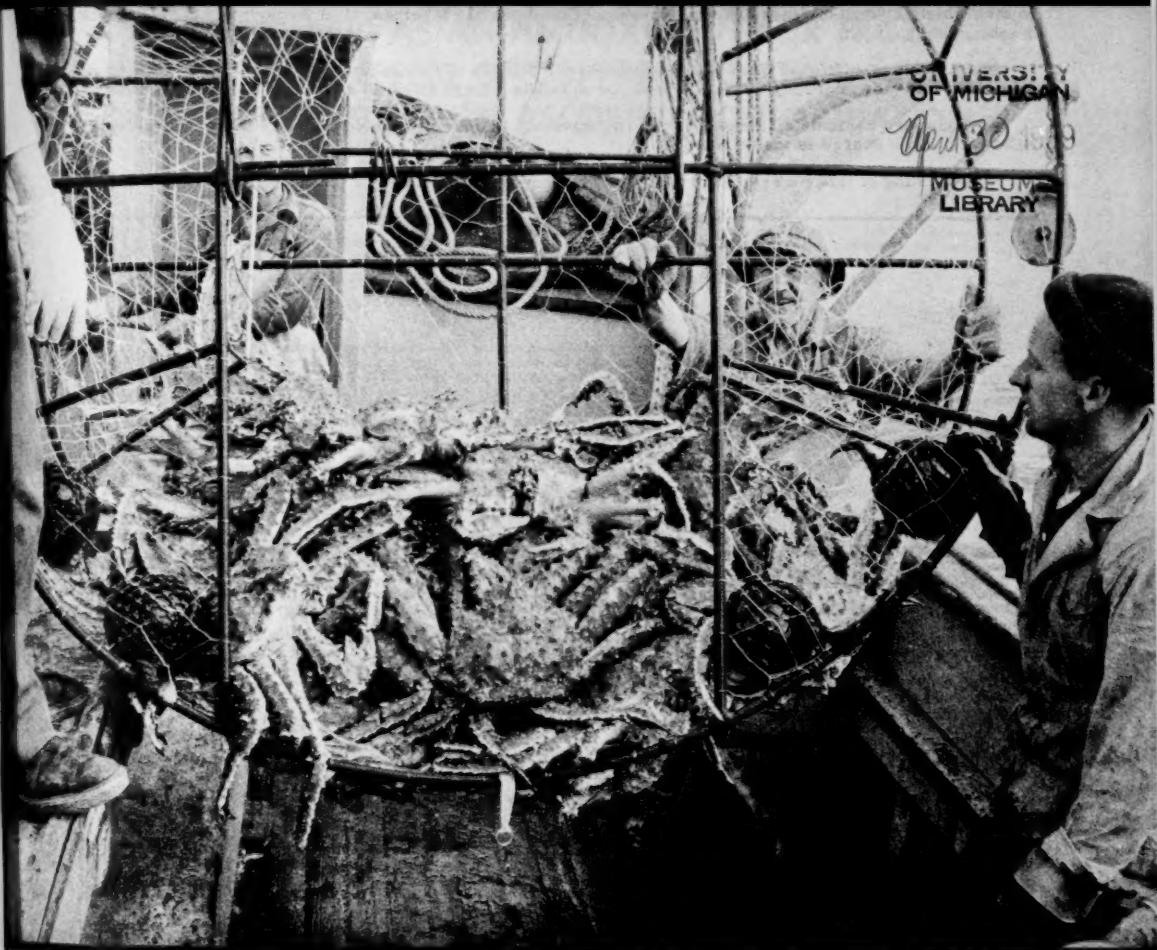


*SIX BY FISHERS*

*Cat*

# COMMERCIAL FISHERIES REVIEW



Vol. 21, No. 3

MARCH 1959

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Washington, D.C.

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BUREAU OF COMMERCIAL FISHERIES

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DIVISION OF INDUSTRIAL RESEARCH  
AND SERVICES

HAROLD E. CROWTHER, CHIEF



# COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries  
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor  
H. M. Bearse, Assistant Editor

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5/31/60

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# COMMERCIAL FISHERIES REVIEW

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## ASCORBIC ACID AS AN ANTIOXIDANT FOR FROZEN OYSTERS AND EFFECT OF COPPER-CHELATING ABILITY OF OYSTER TISSUE ON ASCORBIC ACID OXIDATION<sup>1/</sup>

By Mark G. Schwartz and Betty M. Watts\*

### ABSTRACT

This study reports (1) the antioxidant effect of ascorbic acid on rancidity in frozen raw and cooked oysters and (2) the copper-chelating ability both of raw and of cooked oyster tissue as it may affect oxidative rancidity and the efficacy of ascorbic acid as an antioxidant.

### INTRODUCTION

In general, fishery products are susceptible to oxidative rancidity, owing to their content of highly unsaturated oil; and ways and means of protecting fishery products from rancidity are being sought.

Several primary oil antioxidants have been used with success in preventing or retarding rancidity in oils and in foods containing oil. Among these antioxidants are butylated hydroxyanisole (BHA) and nordihydroquiaretic acid (NDGA), which are phenolic compounds that have been reported as being effective antioxidants for lard and other animal fat (Dugan et al 1950, Kraybill et al 1949, and Lehmann and Watts 1951). Using a commercial mixture, Tenox N, containing 74 percent propylene glycol, 20 percent BHA, 4 percent anhydrous citric acid, and 2 percent NDGA, Gardner and Watts (1957) were able to inhibit oxidative changes characterized by a "rancid fish" odor in cooked oysters. The phenolic antioxidants, however, are almost insoluble in water, and to distribute them uniformly over the surface of the oysters is difficult. A water-soluble antioxidant would offer advantages in ease of application.

Tarr (1946 and 1947), using ascorbic acid, was able to inhibit rancidity in frozen herring, black cod, and several varieties of salmon. Use of the dip and

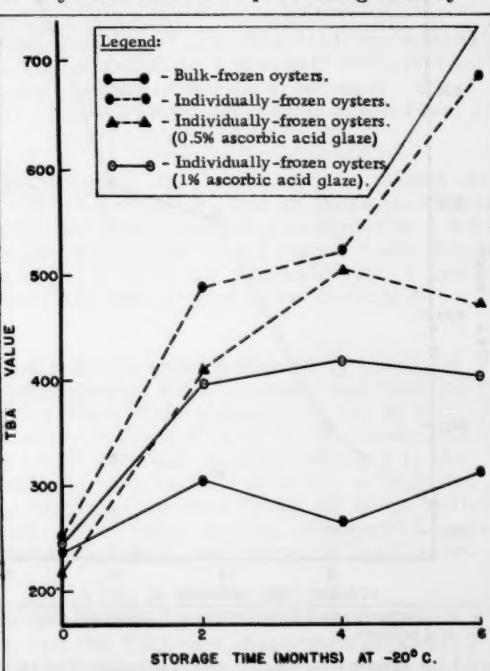


Fig. 1 - TBA value versus storage time of raw frozen oysters.

<sup>1/</sup>This research was conducted by Florida State University under a contract with the U. S. Bureau of Commercial Fisheries. It was financed with funds made available under Public Law 466, 83rd Congress, approved July 1, 1954, generally termed the Saltonstall-Kennedy Act. The study was made possible through the cooperation of the Oceanographic Institute, Florida State University.

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spray methods of applying ascorbic acid to fish fillets has been reported to be commercially practical for retarding rancidity (Bauerneind, Smith and Siemers 1951). Oxidative changes--loss of color, odor, and flavor--occurring in stored frozen shrimp, were inhibited by the use of ascorbic acid (Faulkner and Watts 1955).

On the other hand, ascorbic acid acts as a strong prooxidant in artificial systems in which fat is brought into contact with an aqueous phase (Scarborough and Watts 1949). Its activity in complex food thus is seemingly inconsistent; that is, it may accelerate as well as inhibit rancidity. Watts and Lehmann (1952) have observed acceleration of rancidity in frozen meat to which ascorbic acid was added. Krukovsky and Guthrie (1945 and 1946) have shown that ascorbic acid definitely accelerates development of oxidized flavor in milk. Banks (1952) has observed inconsistent results using ascorbic acid for protecting fish fillets. In a number of experiments in our laboratory, the addition of ascorbic acid to meats sometimes has accelerated and sometimes has inhibited rancidity.

There is considerable evidence in the literature implicating copper in cases where ascorbic acid acts as a prooxidant. Kelley and Watts (1957) suggest that the free radical formed in the copper-catalyzed oxidation of ascorbic acid can cause the dehydrogenation of the active methylene group of the fat, which is believed to initiate fat rancidity. Using an aqueous fat system, they found that only those compounds with marked ability to chelate copper synergized with ascorbic acid to retard rancidity. In the absence of copper chelators, rancidity was invariably accelerated by ascorbic acid.

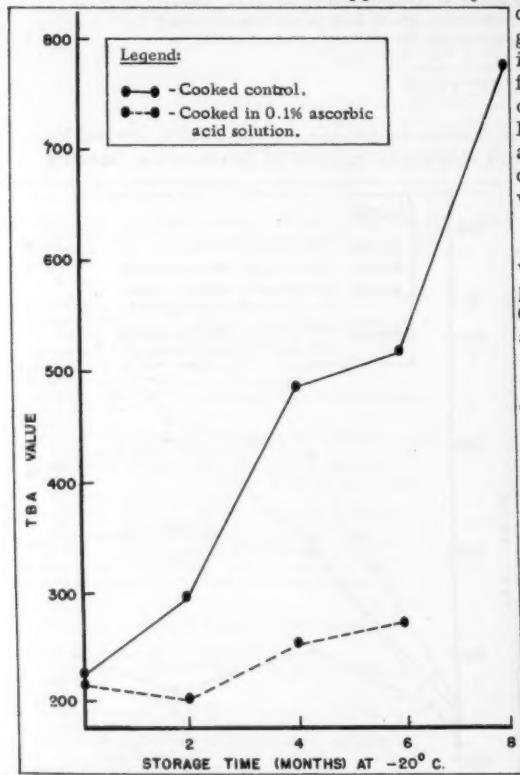


Fig. 2 - Cooked control versus oysters in 0.1-percent ascorbic acid solution.

Since the copper content of oysters varies between 0.1 and 0.2 milligrams per gram (Galtsoff and Whipple 1931 and Galtsoff et al 1947), one would expect ascorbic acid to accelerate rancidity in the oyster unless the copper is bound within the oyster tissue. The objectives of the present investigation therefore were (1) to study the antioxidant effect of ascorbic acid on oysters and (2) to measure the copper-chelating ability of oyster tissue.

#### SAMPLES

All oysters used in this study were of the species *Crassostrea virginica*, tonged from Cat Point Reef in the Gulf of Mexico. They were purchased freshly shucked from a commercial packing house in Apalachicola, Fla.

#### ANTIOXIDANT EFFECT OF ASCORBIC ACID

Raw oysters, if frozen, ordinarily will be frozen in bulk. Individually-frozen oysters, however, might offer advantages, since a product of this nature would aid the consumer in selecting desired quantities without having to thaw the entire pack. In previous work on cooked oysters in this Laboratory, observations indicated that the cooked refrigerated oysters

are subject to oxidative change. The experiments described in this section therefore were designed to show the antioxidant effect of ascorbic acid (1) on raw oysters (a) frozen in bulk and (b) frozen individually and (2) on oysters frozen after cooking.

**PROCEDURE:** Freshly-shucked oysters were divided into two groups: I and II; and those in group I were further divided into two subgroups: A and B. The oysters in group A were treated with ascorbic acid, packed in bulk, and placed in frozen storage. Those in group B were further subdivided into groups B<sub>1</sub> and B<sub>2</sub>. Those in group B<sub>1</sub> were frozen individually, treated with a 0.5-percent solution of ascorbic acid, and placed in frozen storage. Those in group B<sub>2</sub> were given the same treatment except that the concentration of ascorbic acid was 1 percent. The oysters in group II were cooked in water containing ascorbic acid (this also served to inactivate catalase) and were placed in frozen storage. Suitable controls were prepared for all groups.

Two methods of measuring the antioxidant effect of ascorbic acid were used: organoleptic test and thiobarbituric acid (TBA) test, with the principal emphasis being placed on the TBA test.

Table 1 - Copper-Chelating Ability of Oyster Tissue

Sample	O <sub>2</sub> Consumed/Hr.	Inhibition
	Microliters	Percent
Raw tissue only	16	-
Cooked tissue only	0	-
Ascorbic acid + copper	170	-
Ascorbic acid + copper + raw tissue	89	48
Ascorbic acid + copper + cooked tissue	15	91

The details of the procedure are given in the following subsections.

**Preparation of Raw Oysters Frozen in Bulk (Oysters Packed and Frozen in Their Own Liquor):** One part of a 10-percent solution of ascorbic acid was added to 100 parts of raw oysters to bring the final concentration to 1 percent; sufficient natural liquor was present to insure uniform distribution of the ascorbic acid. The oysters were then packed in pint, metal, friction-top cans and stored in a freezer at -20° C. (-4° F.).

**Preparation of Raw Oysters Frozen Individually:** Raw oysters were placed individually on aluminum foil and frozen at -38° C. (-36.4° F.) for 25 minutes. These individually-frozen oysters were divided into two lots. One lot was dipped in a 0.5-percent solution of ascorbic acid and the other was dipped in a 1-percent solution of ascorbic acid. The oysters were put back in the freezer for approximately 2 minutes; packed in pint, metal, friction-top cans; and then stored in the freezer at -20° C. (-4° F.).

**Preparation of Cooked Oysters:** Cooked oysters were prepared by placing 1 pint of oysters in an aluminum frying basket, allowing them to drain, and then immersing them in 1½ quarts of boiling distilled water and holding them for 2½ minutes at 90° to 95° C. (194° - 203° F.). Catalase was inactivated by the treatment. The oysters, prior to cooking, were treated with ascorbic acid by adding it to the water in sufficient quantity to make the final concentration of ascorbic acid in the water 0.1 percent. The pH of the ascorbic acid was adjusted to the pH of the oysters (seasonal variation of pH occurs in oysters). After being cooked, the oysters were allowed to cool; packed in pint, metal, friction-top cans; and stored in the freezer at -20° C. (-4° F.).

**Sampling and Testing:** Samples of 100 grams were removed from the freezer every 2 months over a period of 6 months, and the TBA test, described elsewhere (Schwartz and Watts 1957), was employed to follow oxidative changes. Odor and flavor were evaluated by a small group of two to four persons actively engaged in

oyster research. The small size of the panel and the lack of uniform score cards and rating technique, however, did not permit statistical analysis of the results.

**RESULTS AND DISCUSSION OF ANTIOXIDANT EFFECT:** Raw, untreated oysters frozen in bulk showed no consistent increase in rancidity as measured by TBA value. Application of ascorbic acid therefore was not measurably beneficial. Ascorbic acid, however, did give protection against rancidity to raw oysters frozen individually and to cooked frozen oysters. The detailed results are given in the following subsections.

**Raw Oysters Frozen in Bulk:** Pottinger (1951) observed that the use of ascorbic acid in frozen raw oysters did not retard darkening or other quality changes in oysters during frozen storage at 0° F. for a period of 12 months. Osterhaug and Nelson (1957), working with *Crassostrea gigas*, the Pacific Coast oyster, found that use of ascorbic acid did not consistently or significantly extend the shelf life or prevent pigment changes in frozen raw oysters stored for 13 months.

Raw oysters frozen in bulk do not develop the typical "rancid fish" odor (Gardner and Watts 1957). In the present work, the raw oysters did not show a consistent increase in TBA value (fig. 1) but fluctuated somewhat erratically, and the addition of 1-percent ascorbic acid to the raw oysters frozen in bulk resulted in no significant differences in the TBA value between treated and untreated samples. These frozen raw oysters, with and without ascorbic acid, developed what has been described as a "grassy" odor. When the oysters were cooked, the odor disappeared, and a fresh cooked "oyster" odor was present.

**Raw Oysters Frozen Individually:** In contrast to the results obtained with bulk-frozen oysters as discussed above, individually-frozen raw oysters were observed to develop the "rancid fish" odor, together with an increase in TBA value (fig. 1) similar to that of cooked oysters. This odor was believed to be due to the greater exposed surface area, a condition that also exists in the cooked oysters. After 2 months' storage, a slight "rancid fish" odor was detected in the ascorbic acid-treated individually-frozen oysters along with a slight rise in TBA value. Neither the intensity of the "rancid fish" odor nor the TBA value approached that of the untreated individually-frozen oysters. Although no difference in odor could be detected between the oysters with the 0.5-percent ascorbic acid glaze and the 1-percent ascorbic acid glaze, higher TBA values were observed for oysters treated with the lower concentration of ascorbic acid (fig. 1). It is quite possible that higher concentrations of ascorbic acid employed as a glaze may inhibit the oxidative change to an even greater extent.

**Cooked Oysters:** Previous investigations (Gardner and Watts 1957 and Schwartz and Watts 1957) in this Laboratory indicated that cooked refrigerated oysters are subject to oxidative change with a concomitant rise in TBA value. The results obtained in the present experiment on cooked frozen oysters followed the same general pattern. Figure 2 illustrates the TBA values of cooked frozen oysters with and without 0.1-percent ascorbic acid added to the cooking water. As can be observed, oysters treated with ascorbic acid showed very little rise in TBA value. After storage for 6 months, cooked oysters treated with ascorbic acid still retained an "oyster" odor. In contrast, a slight "rancid fish" odor developed in the untreated oysters after only 2 months of storage, and the "rancid fish" odor developed in intensity, along with increased TBA values, during subsequent periods of storage.

#### COPPER-CHELATING ABILITY

The experiments reported in this section were devised to determine if there is a difference in copper-chelating ability between raw and cooked oysters, as had been indicated in earlier experiments in this Laboratory.

**PROCEDURE:** Copper-chelating ability was determined by measuring the degree of inhibition of the copper-catalyzed oxidation of ascorbic acid in a Warburg

apparatus in the presence and absence of fresh-raw or freshly-cooked oyster tissue. A modification of the procedure employed by Frieden and Alles (1958) was used.

Homogenates of raw and cooked tissue were prepared by adding an equal amount of glass-distilled water to a known weight of oysters and blending the mixture in a Waring blender. The homogenates were added to 0.1-percent ascorbic acid solution buffered at pH 5.8 with 0.01 M phosphate buffer in the presence and absence of  $5 \times 10^{-6}$  M copper solutions.

Double side-arm Warburg vessels were used. All solutions were placed in the main compartments with the exception of the copper solution, which was added to one side arm, and a 20-percent solution of sulfuric acid, which was added to the other side arm to absorb any basic volatile substances. A 30-percent solution of sodium hydroxide was added to the center well to absorb the carbon dioxide produced. Earlier trials employing single side-arm Warburg vessels consistently resulted in evolution of gas. When double side-arm vessels were used with the addition of sulfuric acid to absorb any basic volatile substances, oxygen uptake by the tissue homogenate was observed.

The vessels were attached to their specific manometers and placed in the constant temperature bath ( $23^{\circ}$  C. or  $73^{\circ}$  F.). Air was the gas phase. Ten minutes was allowed for equilibration before the stopcocks were closed; the copper solution in the side arm was then tipped into the main compartment of those vessels to which it was added, and the zero reading was taken. Readings were observed at intervals of 10 minutes for 1 hour.

**RESULTS AND DISCUSSION OF COPPER-CHELATING ABILITY:** Cooked oysters were found to have greater copper-chelating ability than raw oysters. The fact that the cooked oysters also apparently have greater exposure of the sulfhydryl group is offered as a suggested explanation of the greater copper-chelating ability of the cooked oysters. The degree of binding or chelating of the copper by the meat determines to a large extent the efficacy of the ascorbic acid as an antioxidant. Details of the findings are given in the following two subsections.

**Raw Versus Cooked Oysters:** That ascorbic acid in the presence of copper becomes a strong prooxidant rather than an antioxidant has been noted (Kelley and Watts 1957). Table 1 illustrates the relative effects of raw and of cooked oyster tissue on the copper-catalyzed oxidation of ascorbic acid. Other experiments performed by the authors indicate that raw tissue exhibits a 50- to 60-percent inhibition of this reaction. Observations on cooked tissue showed an inhibition of 80 to 90 percent.

**Sulfhydryl Groups:** It was therefore reasonable to assume that some change occurs during the cooking of oysters that imparts to the cooked tissue its increased copper-complexing ability. Barbu, Lessian, and Macheboeuf (1949) have shown that treatment of proteins with strong alkali produces sulfhydryl groups, which then combine with copper. The presence of sulfhydryl groups in oysters was indicated by a test described by Chinard and Hellerman (1954). A drop of concentrated ammonium hydroxide followed by a drop of 5-percent nitroprusside was added to the oyster surface. In the presence of free sulfhydryl groups, a deep rose color develops. This deep rose color was noted in the cooked oysters; the raw oysters exhibited only a light pink. Greater exposure of sulfhydryl groups thus may account for the greater copper-chelating ability of cooked oysters.

#### CONCLUSIONS

1. Untreated raw oysters frozen in bulk and stored at  $-20^{\circ}$  C. ( $-4^{\circ}$  F.) showed no consistent increase in organoleptic value or TBA value, and treatment with a 1-percent ascorbic acid solution resulted in no appreciable difference in organoleptic value or TBA value between treated and untreated samples.

2. Untreated raw oysters frozen individually and stored at -20° C. (-4° F.) developed a rancid odor and increased TBA value. Use of 0.5-percent and 1-percent ascorbic acid glazes retarded, to some extent, oxidative change. The 1-percent ascorbic acid glaze was seemingly more effective than was the one of lower concentration.

3. As was to be expected, the oysters frozen in bulk showed lower TBA value on storage at -20° C. (-4° F.) than did the oysters frozen individually. The untreated bulk-frozen oysters also showed lower TBA value in storage than did the individually-frozen oysters that had been given an ascorbic acid glaze.

4. Untreated cooked oysters, frozen and stored at -20° C. (-4° F.) developed a rancid odor and increased TBA value. Cooking the oysters in 0.1-percent solution of ascorbic acid resulted in a definite decrease in rancidity and lower TBA value.

5. In confirmation of earlier experiments in this Laboratory, cooked oyster tissue was observed to be a more effective inhibitor of the copper-catalyzed oxidation of ascorbic acid than was raw oyster tissue. It is suggested that a greater exposure of sulphydryl groups in cooked tissue may be responsible for its greater copper-chelating ability.

6. The effectiveness of ascorbic acid as an antioxidant in oysters is largely determined by the degree to which the physiological copper is "bound" by the meat and by the marketing form in which the oyster is offered to the consumer.

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## KING CRAB, SHRIMP, AND BOTTOM FISH EXPLORATIONS FROM SHUMAGIN ISLANDS TO UNALASKA, ALASKA - SUMMER AND FALL, 1957

By Harold C. Johnson\*

### SUMMARY

Exploratory fishing to determine the availability and abundance of king crab, shrimp, and bottom fish in certain waters from the Shumagin Islands to Unalaska, Alaska, was conducted by the U. S. Bureau of Commercial Fisheries from July 18 to October 1, 1957. The M/V Tordenskjold, a Seattle commercial trawler, was chartered with Saltonstall-Kennedy Act funds for the work.

A variety of fishing gear was used, including circular and rectangular king crab pots, large-mesh otter trawls, and a Gulf of Mexico-type shrimp trawl.

During the investigations, 61 otter-trawl drags and 36 shrimp trawl drags were made and 534 individual king-crab pots were set.

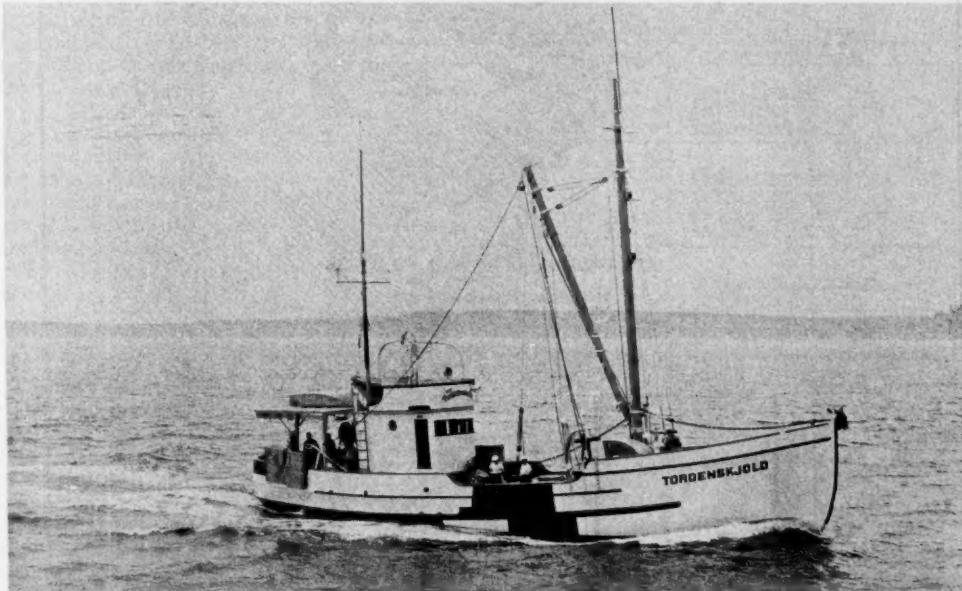


Fig. 1 - Chartered vessel M/V Tordenskjold.

The best catch of king crab using an otter trawl occurred between Umga and Cherni Islands. Other catches of king crabs with the trawl were generally small and not considered productive enough to warrant commercial exploitation. Localities that yielded promising king crab catches while fishing with pots included Stepovak Bay, Dorenoi Bay, and vicinity, off Chichagof Bay, between Umga and Cherni Islands, and Cold Bay.

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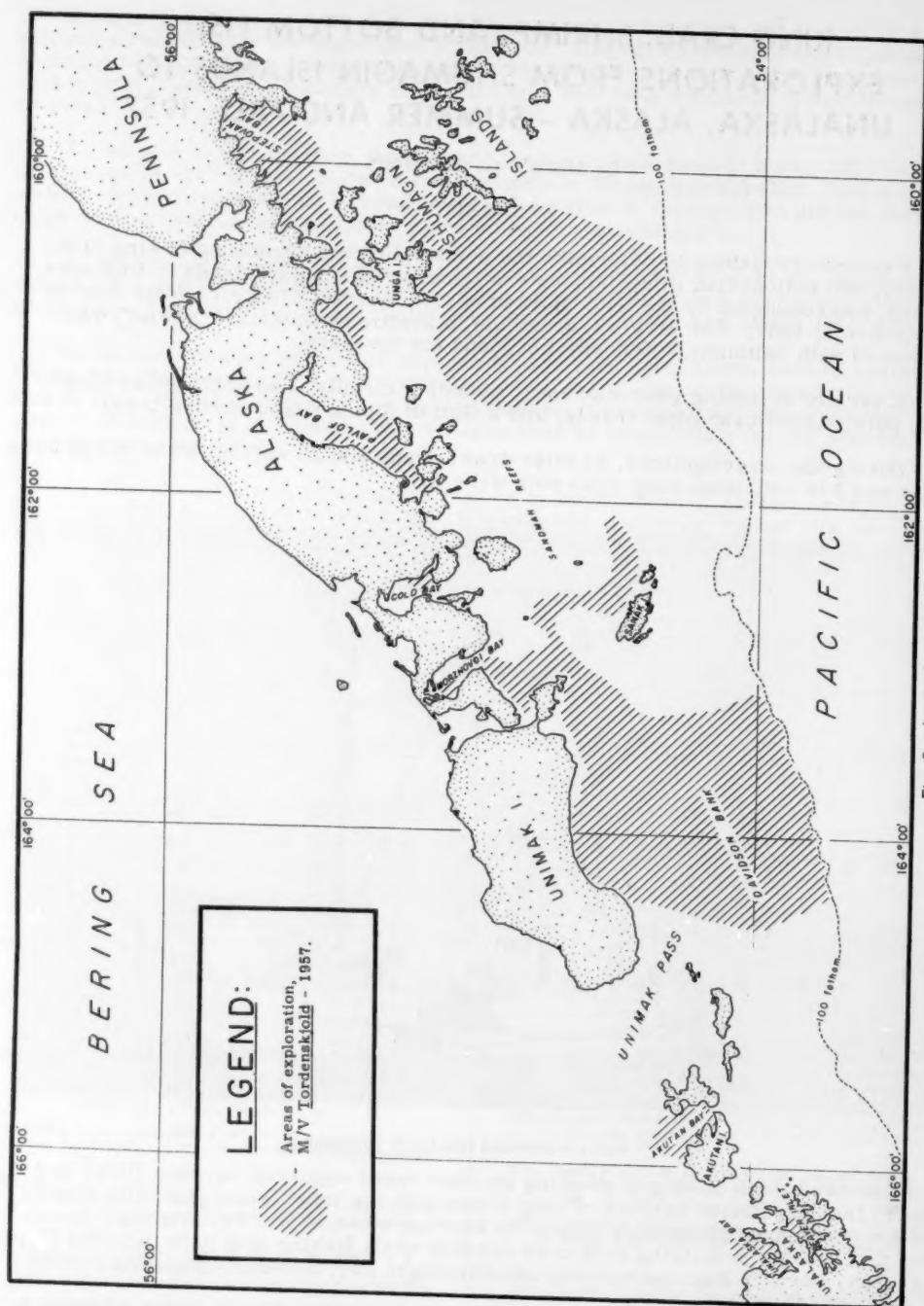


Fig. 2 - Areas of exploration.

Excellent catches of shrimp were made using the lined otter trawl and the Gulf of Mexico-type shrimp trawl. Large catches of pink shrimp were made in Balboa Bay, Unga Strait, Stepovak Bay, near Sealion Rocks, and in the vicinity of Beaver and Pavlof Bays. The best shrimp trawl drag of the cruise produced a catch of 3,800 pounds of shrimp in 30 minutes. A number of drags were made which yielded shrimp at rates exceeding 5,000 pounds an hour. Fair signs of larger size varieties such as side-stripe shrimp and coon-stripe shrimp were, at times, mixed with the pink shrimp.

With the exception of a 5-day storm, which occurred during the latter part of August, little time was lost due to adverse weather conditions. As many of the areas fished were in semiprotected waters, small squalls did not hamper fishing activities.

### INTRODUCTION

Exploratory fishing for king crab, shrimp, and bottom fish was carried out from July 18 to October 1, 1957, from the Shumagin Islands to Unalaska Bay, Alaska (fig. 2), by the schooner-type trawler *Tordenskjold*. The vessel was chartered by the U. S. Bureau of Commercial Fisheries with funds provided by the Saltonstall-Kennedy Act of 1954.

The primary objective of this exploratory fishing was to determine the distribution and availability of king crab in waters beyond the range of those now commercially fished. In addition, information on the distribution and availability of bottom fish and shrimp inhabiting the area was collected.

The work was carried out in cooperation with the Bureau's King Crab Investigations, and during part of the cruise a biologist was aboard the *Tordenskjold* to tag king crab and collect pertinent information.

### BACKGROUND INFORMATION

The presence of king crab in the inshore waters near the Shumagin Islands and Alaska Peninsula has been known for many years. Approximately

4,000 male crabs were reported taken from Pavlof Bay and Canoe Bay in 1938. In 1940 and 1941 fishing operations carried out in Pavlof Bay and Canoe Bay by the Alaska Crab Investigations of the Fish and Wildlife Service revealed a crab population sufficient to support a profitable commercial operation (Anonymous 1942). During the same investigation, Cold Bay and Volcano Bay were also reported to have fair concentrations of king crab.

In the ensuing years the king crab fishery in this area developed slowly. Landings in recent years, however, have increased rapidly and between 1954 and 1956 the catch from the Shumagin area rose from 316,660 pounds to 2,043,967 pounds.

Shrimp and bottom fish, with the exception of halibut and true cod, have not been commercially exploited in the Shumagin Islands or in the areas explored along the Alaska Peninsula.

Species of Fish and Shellfish Mentioned in this Report	
Common Name	Scientific Name
<b>Crab:</b>	
Dungeness . . . . .	<i>Cancer magister</i>
King . . . . .	<i>Paralithodes camtschatica</i>
Tanner . . . . .	<i>Chionoecetes bairdii</i>
<b>Shrimps:</b>	
Coon-stripe . . . . .	<i>Pandalus hypsinotus</i>
Humpy . . . . .	<i>Pandalus goniurus</i>
Pink . . . . .	<i>Pandalus borealis</i>
Side-stripe . . . . .	<i>Pandalopsis dispar</i>
<b>Food and Miscellaneous Bottom Fish:</b>	
Alaska pollock . . . . .	<i>Theragra chalcogramma</i>
Arrow-toothed flounder (turbot) . . . . .	<i>Atheresthes stomias</i>
Eelpout . . . . .	<i>Lycodes sp.</i>
Halibut . . . . .	<i>Hippoglossus stenolepis</i>
Lemon "sole" . . . . .	<i>Pleuronectes quadrifurcatus</i>
Rex "sole" . . . . .	<i>Glyptocephalus zachirus</i>
Rock "sole" . . . . .	<i>Lepidotrigetta bilineata</i>
Sand dab . . . . .	<i>Citharichthys sordidus</i>
Sand "sole" . . . . .	<i>Psettidichthys melanostictus</i>
Sculpin . . . . .	<i>Hemilepidotus sp.</i>
True cod . . . . .	<i>Gadus macrocephalus</i>

## FISHING GEAR AND METHODS

**OTTER TRAWLS:** Standard 400-mesh eastern and western otter trawls were used to carry out trawling operations for king crab and bottom fish. The eastern trawl had  $4\frac{1}{4}$ -inch mesh<sup>1/</sup> in the wings, square, and body, and  $3\frac{1}{2}$ -inch mesh in the intermediate and cod end. Details of the eastern trawl have been described by Greenwood (1958). The western trawl was constructed of  $4\frac{1}{2}$ -inch mesh throughout.



Fig. 3 - The otter trawl on the surface showing the aluminum floats.

Specifications of this trawl have been described by Alverson (1951). From 16 to 22 aluminum-alloy 8-inch-diameter spherical floats were spaced evenly along the head rope of each net. The last six feet of each cod end of both style trawls were lined with  $1\frac{1}{2}$ -inch cotton webbing to retain shrimp and immature king crab encountered during the exploration. All drags were made for a period of one hour, when possible, and the average towing speed was 2.4 knots.

**GULF SHRIMP TRAWL:** Shrimp drags were made with a 43-foot flat Gulf of Mexico-type shrimp trawl (Schaefers and Johnson 1957) constructed from  $1\frac{1}{2}$ -inch mesh cotton

webbing. The net, secured directly to the aft end of the doors with 2-foot extensions of the head rope and foot rope, was towed with a single warp using a 25-fathom bridle ahead of the doors. The shrimp trawl was usually towed for 30 minutes; however, in areas where shrimp catches were large the towing time was reduced to 20 minutes.

**KING CRAB POTS:** Circular pots similar to those used in the commercial king-crab fishery of Alaska and patented box-shaped collapsible pots were used during the investigation. The circular pots were 72 inches in diameter, and 24 inches high with two tunnels located opposite each other on the 24-inch side. The framework was constructed of  $\frac{3}{4}$ -inch mild steel rod, and covered with 4-inch (open mesh) webbing handwoven from 16-gauge stainless steel wire. A hinged access lid, approximately 30 inches by 36 inches, was located on the top of the pot.



Fig. 4 - Commercial-type crab pots as used by the *Tordenskjold*.

Several variations of the standard circular pot were fished, including a 3-tunnel pot and a number of pots with the top frame 12 inches less in diameter than the bottom frame.

<sup>1/</sup>All mesh sizes in this report refer to stretched measure.

The patented box-shape, collapsible pots were 36 by 72 inches at the base, 36 by 60 inches on top, and 30 inches high. The frames were fabricated of  $\frac{5}{8}$ -inch-diameter galvanized mild steel rods (Schaefers et al 1955). The box-type pots proved too light for fishing in offshore waters and it was necessary to add approximately 25 pounds of chain to the bottom of each pot to prevent drifting.

#### BUOYS AND BUOY LINES:

Most pots were fished using rubberized canvas bags 14 to 18 inches in diameter as buoys. A single buoy served as a surface float for each pot to hold at the surface the line from the pot on the bottom and provide a marker. Cotton belting or manila rope were used as harnesses for these buoys but the latter proved undesirable because of excessive chafing (see fig. 7). Cylindrical oxygen tanks of stainless steel, painted yellow and having  $1\frac{1}{2}$  to 2 cubic feet displacement, were also used as buoys, but these were difficult to see under certain light and water conditions.



Fig. 5 - Weaving the webbing of stainless steel wire on a crab pot.

Buoy lines were assembled from 50-fathom lengths of  $\frac{9}{16}$ -inch or  $\frac{5}{8}$ -inch-diameter manila rope joined to a 25-fathom length of  $\frac{39}{32}$ -inch diameter manila rope.

Sufficient sections were joined end-to-end so that the heavier lines were always longer than the depth of water. A gill-net type, 8-inch plastic float was threaded on the lower section of each buoy line and allowed to run free between the pot and a stopper above the pot. This method of rigging prevented chafing of the buoy line on the bottom or against the pot.

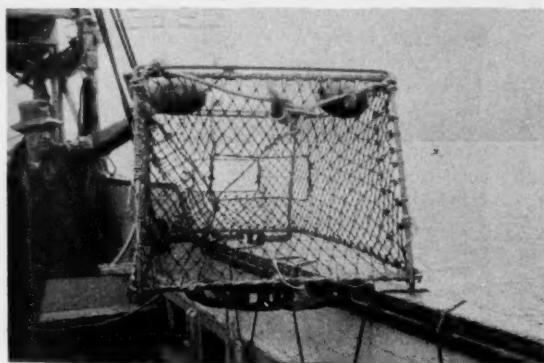


Fig. 6 - Collapsible-type pot with extra weight added to the bottom to prevent drifting from its set position.

consisted of a tapered bamboo pole 15 to 18 feet long, a raft-type radar reflector on top. Locating gear in offshore waters proved to be relatively simple with the aid of radar reflectors (see fig. 8).

**BAITING AND FISHING THE KING CRAB POTS:** Bait bags consisted of  $1\frac{1}{2}$ -inch mesh, 42-thread, treated cotton webbing, 23 meshes long and 20 meshes wide. To form the bag, square-cut webbing was folded in half and sewed along the open side and bottom. The throat was closed by threading an 18-gauge stainless steel wire through the selvage meshes so that it would operate in a slip-knot fashion.

The bag, baited with about  $2\frac{1}{2}$  pounds of fresh or fresh frozen chopped fish was placed inside the pot midway between the tunnel entrances, and held in place by a

double wire-hook arrangement. One hook was attached directly to the bait bag while a short section of heavy rubber was used between the bait bag and the other hook. The hooks, formed from eight-gauge wire, were secured to the top and bottom of the bait bag and fastened to opposite tunnel entrance frames during fishing. The rubber section provided tension to hold the bait in place and allowed easy handling of the bag.

Sculpin, arrow-toothed flounder, and Alaska pollock were the principal baits, although occasionally other species of flat fish and roundfish were tried.

The pots were usually set in strings or rows composed of 8 to 20 individual pots. The total number of pots in a string is called a pot set, although for purposes of clarity in the text and tables, some continuous strings are divided into two sets and other non-continuous strings are included as a single and numbered accordingly.

Distances between individual pots in a string usually ranged from one-fourth to one-half mile.

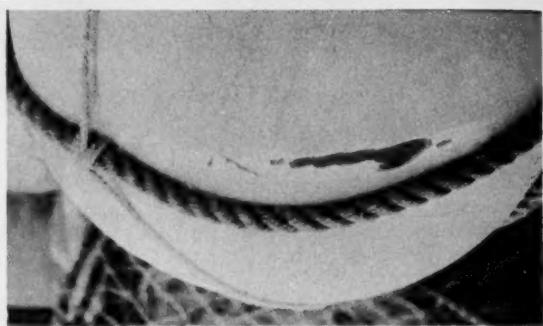


Fig. 7 - Excessive chafing caused by a rope harness.

one-fourth to one-half mile.

As it was difficult to accommodate crab pots on deck concurrent with trawl fishing, the pots were usually hauled and reset during one day's operation. When feasible, trawl fishing was conducted in the same general area on the following day.

**VESSEL USED:** The *Tordenskjold*, a schooner-type vessel, is 75 feet in length, with a beam of 18 feet, and a mean-load draft of 9 feet. Built for the halibut fishery, the vessel was converted in 1942 for use in trawl fisheries. This vessel was chartered by the U. S. Bureau of Commercial Fisheries earlier in 1957 for bottom-fish explorations off South-eastern Alaska (Greenwood 1958).

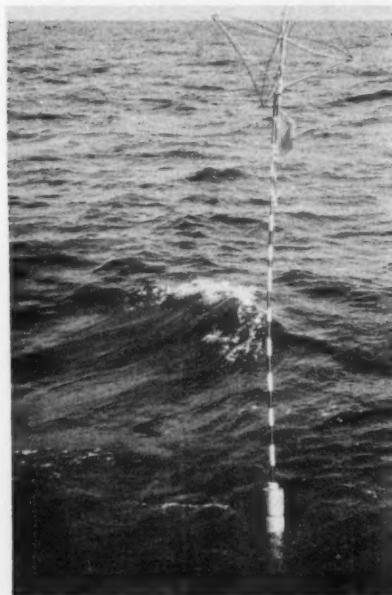


Fig. 8 - Radar reflections on the marker buoys proved an aid for locating the gear.

534 individual king crab pots were set.

The location of each otter-trawl drag and king crab pot is diagrammatically illustrated in figures 9 and 11, and of each Gulf shrimp trawl in figure 12.

#### FISHING RESULTS

Exploratory operations were conducted along the south side of the Alaska Peninsula from Stepovak Bay westerly to Unalaska Island in the Aleutian group. (See fig. 2.) Fishing was carried out in most of the major bays within this area and in offshore waters extending out to the 100-fathom contour. During the exploration, 61 otter-trawl drags were made for king crab and bottom fish, 36 drags were made with a Gulf of Mexico-type shrimp trawl, and

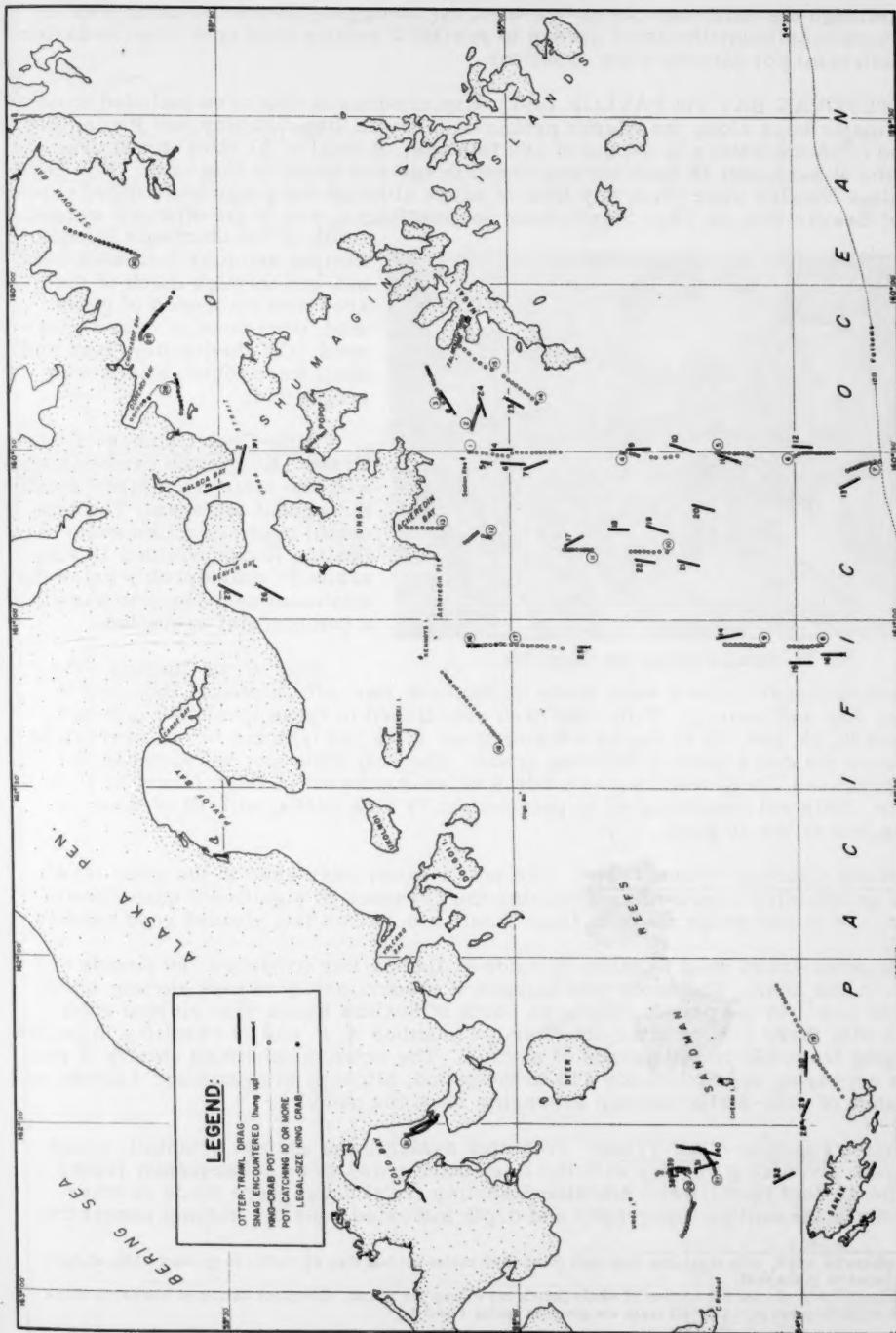


Fig. 9 - Location of otter-trawl drags and king-crab pot sets from Stepovak Bay to Samalik Island.

Although the catch per pot as averaged for an aggregate station catch was, in many instances, below the level needed to sustain a commercial operation, occasionally individual pot catches were excellent.

STEPOVAK BAY TO PAVLOF BAY: Explorations in this area included most of the major bays along the Alaska peninsula between Stepovak Bay and Pavlof Bay, and the offshore waters to depths of 100 fathoms. A total of 27 otter-trawl drags, 18 crab pot sets, and 28 Gulf-shrimp-trawl drags was made in this area. The bays and inlets trawled were generally free of snags although hang-ups were noted outside of Beaver Bay, in Unga Strait, near Sealion Rocks, and in the offshore waters south of the Shumagin Islands.

Bottom samples indicated the sea bed through much of the area was composed of green mud, occasionally mixed with sand. Off Pavlof Bay, lava and shell were found, mixed with green mud.

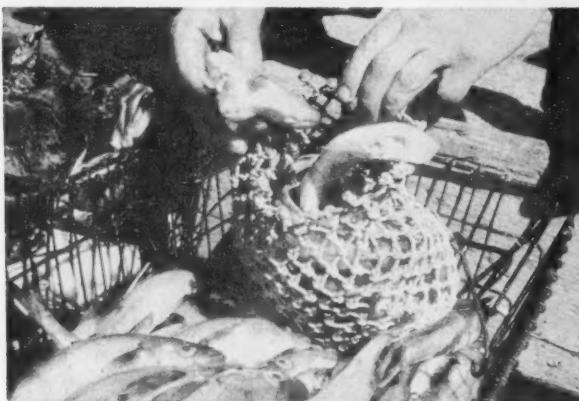


Fig. 10 - Filling a bait bag with chopped fish.

The best crab-pot catches were made in Stepovak Bay, off Chichagof Bay, and in Dorenoi Bay and vicinity. Fifty-one crab pots fished in these localities (pot-set numbers 28, 29, and 30) at depths ranging from 17 to 104 fathoms for an average of 92.6 hours yielded a total of 660 king crabs. The only other pot set (number 16) which produced likely results was made 9 miles southwest of Unga Island in 70 to 87 fathoms. This set consisting of 10 pots caught 79 king crabs, with 66 of them occurring in 4 of the 10 pots.

Shrimp Catches--Otter Trawl: The small-mesh liner used in the otter trawl proved an effective means of ascertaining the presence of significant quantities of shrimp, and initial drags made in Unga Strait and Balboa Bay yielded good catches.

One otter-trawl drag (number 3) made in Balboa Bay produced 760 pounds of shrimp in one hour. The catch was composed predominately of pink shrimp which averaged  $122\frac{3}{4}$  to the pound. The area south of Sealion Rocks also yielded good catches with three 1-hour otter-trawl drags (number 4, 6, and 7) resulting in catches ranging from 240 to 900 pounds of shrimp. The catches consisted chiefly of pink shrimp averaging approximately 113 to the pound, although drag number 4 produced 100 pounds of side-stripe shrimp averaging 28 to the pound.

Shrimp Catches--Gulf Trawl: To better evaluate the shrimp potential, areas which gave promising results with the lined otter trawl were subsequently fished using the 43-foot Gulf trawl. Additional shrimp trawl drags were made in other areas where the bottom topography and depth indicated possible shrimp concentrations.

<sup>2</sup>/Unless otherwise noted, only legal-size king crab (hard-shell males not less than  $6\frac{1}{2}$  inches in greatest width of shell) are referred to in the text.

<sup>3</sup>/All shrimp counts given are the number of whole (heads on) shrimp per pound. Complete details of number of whole (heads on) shrimp per pound for all drags are given in tables 1 and 3.

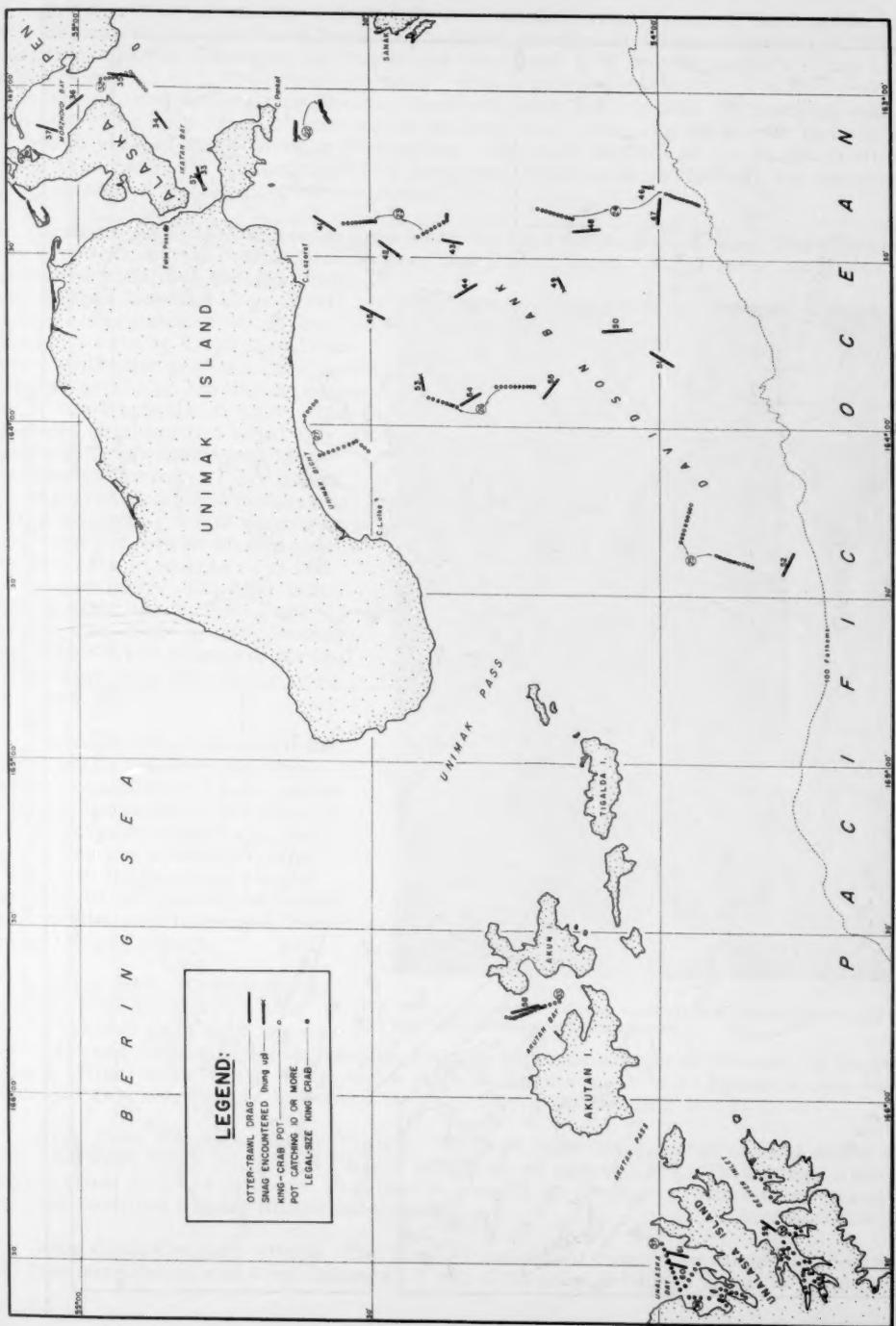


Fig. 11 - Location of otter-trawl drags and king-crab pot sets from Sanak Island to Unalaska Bay.

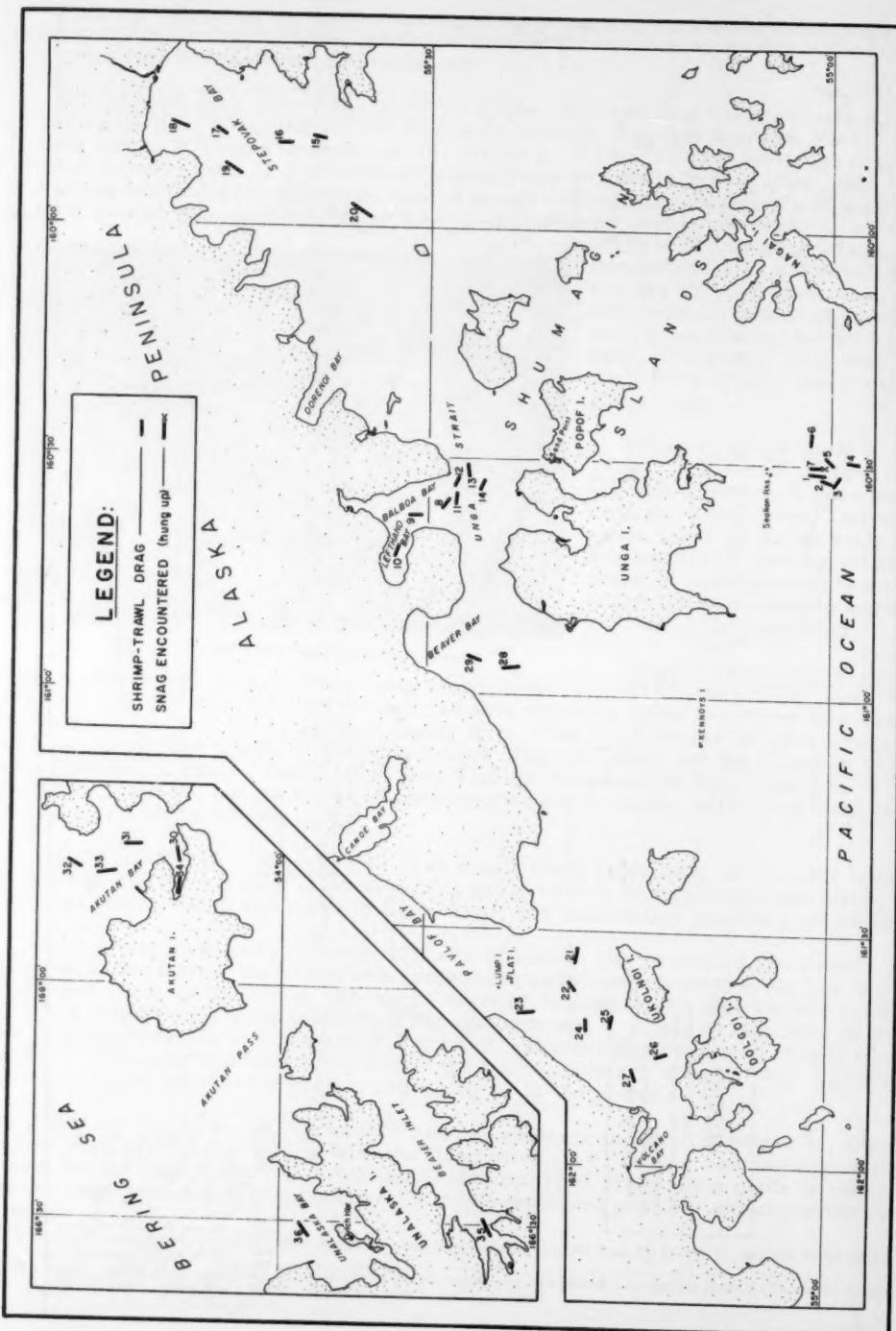


Fig. 12 - Location of Gulf shrimp trawl drags from Steporak Bay to Unalaska Bay.

Good catches of shrimp were made with the Gulf trawl south of Sealion Rocks. Two shrimp drags (numbers 2 and 5) produced catches at a rate exceeding 4,000 pounds an hour and several shrimp drags (numbers 1, 3, and 4) caught shrimp at rates in excess of 2,000 pounds an hour. These catches consisted of mixed pink, side-stripe, and coon-stripe shrimp; however, pink shrimp was the predominant species. The best catch of side-stripe shrimp was made in a shrimp drag (number 5), which yielded 400 pounds in 20 minutes. The pink shrimp caught in the Sealion Rock area ranged from 118 to 157 to the pound, while side-stripe shrimp caught in drag number 5 averaged 57 to the pound.

Inshore explorations for shrimp were carried out in Balboa Bay, Unga Strait, and Stepovak Bay and outside of Beaver and Pavlof Bays. All of these localities produced excellent shrimp catches. Balboa Bay and Unga Strait both yielded catches which exceeded a rate of 4,000 pounds an hour, while the grounds off Pavlof Bay produced shrimp at rates up to 7,300 pounds an hour. The grounds adjacent to Pavlof Bay gave the most consistent large catches of shrimp. Four drags in this area produced catches at rates exceeding 5,000 pounds an hour and 3 drags produced catches at a rate in excess of 3,000 pounds an hour. The best individual catch made during the cruise was made outside Beaver Bay when 3,800 pounds of shrimp were taken in a 30-minute drag (number 29).

Pink shrimp dominated the catch in the inshore bay area; however, catches of side-stripe shrimp in excess of 100 pounds per 20-minute drag were common. Sample counts for pink shrimp in these areas ranged from 92 to 227 per pound, while side-stripe counts ranged from 26 to 135 per pound.

COLD BAY TO SANAK ISLAND: Explorations in this area included Cold Bay, the waters between Unga and Sanak Islands, and the adjacent waters to the east of Sanak Island. Eight otter-trawl drags were made at depths of 40 to 83 fathoms, and four crab-pot sets were made at depths between 38 and 82 fathoms in this area.

King Crab Catches--Otter Trawl: The best otter-trawl catch of king crabs was made between Unga Island and Cherni Island (drag number 39). This drag, made at depths from 66 to 74 fathoms, resulted in a catch of 42 crabs. Other otter-trawl catches resulted in only minor catches of crab.

King Crab Catches--Pots: The largest individual catch was made (set number 21) between Cherni and Unga Islands. A set of 20 pots at depths from 58 to 78 fath-



Fig. 13 - A good catch of shrimp made south of Sealion Rocks using the 43-foot Gulf of Mexico-type shrimp trawl.

oms caught 333 king crabs. The next largest catch, 164 was made with 16 pots fished for 26 hours in Cold Bay (set number 31).

Shrimp Catches: Insignificant catches of shrimp were noted in the lined otter trawl drags made in this area, and no attempts were made to locate shrimp with the Gulf shrimp trawl.

MORZHVOI BAY TO DAVIDSON BANK: Exploratory fishing in this region was conducted in Morzhovoi Bay and Ikatan Bay and on Davidson Bank, south of Unimak Island. A total of 21 otter-trawl drags and 7 sets of king crab pots was made in the area. The drags made in Morzhovoi Bay and Ikatan Bay were free of snags and most of Davidson

Bank was found suitable for trawling. A considerable amount of gravel bottom was noted on Davidson Bank, while green mud was common in bottom samples taken from the bay areas.

Crab and Shrimp Catches: Both otter-trawl drags and pot sets resulted in insignificant king crab catches. Shrimp catches in the lined otter-trawl were also unfavorable.

AKUTAN BAY TO UNALASKA BAY: Explorations in this area were made in Akutan Bay, Beaver Inlet, and Unalaska Bay. Four otter-trawl drags, 5 pot sets, and 7 drags with the Gulf shrimp trawl were made. No snags were encountered during trawl operations; however, the bottom topography was irregular and only a limited amount of trawling ground was located.

Crab and Shrimp Catches: Crab catches made with the otter-trawl were poor. Although the average catch of crabs per pot in this area was low, a few pots fished in Akutan Bay and Unalaska Bay yielded fair catches. In Akutan Bay, 2 pots caught 31 crabs, and in Unalaska Bay, 4 pots caught 86 crabs. Only 1 drag produced any quantity of shrimp. One drag (number 35) made in Beaver Inlet with the Gulf trawl resulted in a catch of 175 pounds of mixed pink and side-stripe shrimp.

Fig. 14 - A catch of 3,300 pounds of shrimp on the deck of the Tordenskjold.

This catch was the result of a 30-minute drag outside Pavlof Bay with the 43-

foot Gulf of Mexico-type shrimp trawl.

INCIDENTAL FISH AND SHELLFISH CATCHES: The best catch of food fish made during the explorations was taken 7 miles southeast of Cape Lazaref in 59 to 62 fathoms where 5,000 pounds of true cod were caught with the otter-trawl (drag number 41). Other catches of food fish were generally small. Species of fish captured in small amounts included rock sole, pollock, sculpin, and turbot.

Tanner crabs were distributed throughout most of the region explored. In Unalaska Bay, 13 pots produced a catch of 1,109 tanner crabs with 169 crabs taken in 1 pot. A catch containing 555 tanner crabs was also taken in 1 otter-trawl drag made in Ikatan Bay.

Dungeness crabs were taken only in sets made in close proximity to the beach and in comparatively shallow water, such as Unimak Bight and Acheredin Bay. Catches of Dungeness crabs were small even in these areas.



## WEATHER CONDITIONS

With the exception of a five-day storm during the latter part of August, little time was lost because of adverse weather conditions. The weather was generally overcast and cloudy with intermittent rain and fog. As many of the areas explored were in semi-protected waters, small squalls did not interfere with fishing activities.

## APPENDIX

Detailed fishing logs which give details for each drag are not included in the Review, but are available upon request as an appendix to the reprint of this article. Write for Separate No. 543, which contains these tables:

Table 1 - Fishing Log--Otter-Trawl Drags Made from Shumagin Islands to Unalaska Bay, Alaska, July 18 to September 29, 1957, U. S. Bureau of Commercial Fisheries Chartered Vessel Tordenskjold.

Table 2 - King Crab Pot Sets Made from Shumagin Islands to Unalaska Bay, Alaska, July 20 to October 1, 1957, U. S. Bureau of Commercial Fisheries Chartered Vessel Tordenskjold.

Table 3 - Gulf Shrimp Trawl Fishing Log--Shumagin Islands to Unalaska Island, Alaska, September 6 to 30, 1957, U. S. Bureau of Commercial Fisheries Chartered Vessel Tordenskjold.

Table 4 - Individual Pots Catching 10 or More Legal-Size King Crab, Shumagin Islands to Unalaska Bay, Alaska, July 20 to October 1, 1957, U. S. Bureau of Commercial Fisheries Chartered Vessel Tordenskjold.

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### TECHNICAL NOTE NO. 51 - USE OF CORN-SIRUP SOLIDS IN PACKAGING AND FREEZING FISH

The quality of frozen fish and shellfish is dependent to a large degree on the use of freezing, packaging, and storage methods that minimize the chemical and physical changes in the product. Much of the research on the use of additives, dips, and coatings results from the desirability of delaying or inhibiting oxidative changes that gradually destroy natural color and fresh flavor.

During the past two years, we have made a number of tests and observations on the potential usefulness of corn-sirup solids in packaging and freezing fish (Anonymous 1957). These tests were not comprehensive, but were limited to cooperative industry trials on small lots of fish and to short-term laboratory tests that we were conducting along with other studies of packaging and storage variables in frozen fishery products. Three uses or applications of corn-sirup solids were investigated. These studies indicated: (1) that a solution of corn-sirup solids may be used as a protective dip or coating in packaging and freezing fish, (2) that the use of smaller concentrations of either corn-sirup solids or dextrose in ice-glazing solutions produces a glaze of desirable properties for frozen whole or dressed fish, and (3) that either corn-sirup solids or dextrose may be used in salt brines to produce immersion-freezing media of desirable properties.

The purpose of this technical note is to describe the characteristics of corn-sirup solids and then to report, from the viewpoint of a processor interested in new techniques, our observations on the three applications of corn-sirup solids to fishery products.

#### CHARACTERISTICS OF CORN-SIRUP SOLIDS

Corn-sirup solids meet to a high degree several basic requirements of a desirable food additive. They are accepted widely as a food component; are easily soluble in water; are colorless, almost tasteless, and odorless; are stable in storage at room temperature; and are economical. In our tests, a regular-conversion

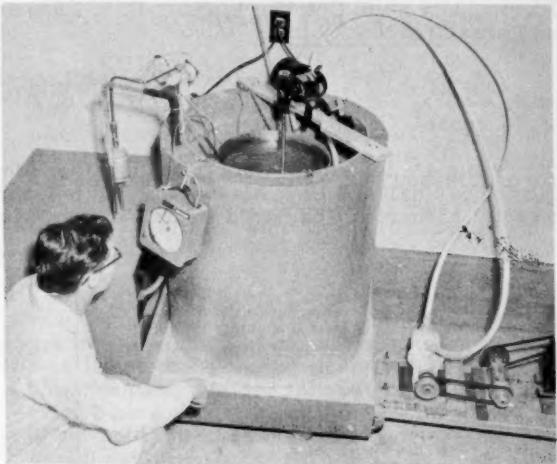


Fig. 1 - Laboratory refrigeration unit used for experimental immersion-freezing of fishery products in modified salt brine.

corn-starch hydrolysate of 42 dextrose equivalent (42 D.E.) was used. Pure dextrose is 100 D.E. The dextrose equivalent is based on the content of total reducing sugars as a percentage of the total dry substance. The average carbohydrate composition of corn-sirup solids of 42 D.E. is shown in table 1, which illustrates the high content of polysaccharides in the product. Other conversion products of the hydrolysis of corn starch may be used for the applications indicated in this report including corn sugar (also called dextrose)--the product derived from complete hydrolysis.

Table 1 - Carbohydrate Composition of Commercial 42 Dextrose Equivalent Corn-Sirup Solids 1/

Type of Conversion	Relative Amounts of the Various Saccharides							
	Mono-	Di-	Tri-	Tetra-	Penta-	Hexa-	Hepta-	Higher
Acid	18.5	13.9	11.6	9.9	8.4	6.6	5.7	25.2

1/ Data from Corn Sirups and Sugars, American Maize-Products Company, New York, 1956.

It appears probably that in the use of corn-sirup solids as a coating for fish prior to packaging and freezing, the preservative effect is due not only to its action as a physical barrier to absorption of oxygen by the fish meat but also to an anti-oxidant or inhibiting effect of the polyhydroxyl compounds in the product. For this reason, corn-sirup solids of different dextrose equivalents may give different results. It should be emphasized that in considering the possible application to a particular product, the processor should make his own tests on a small scale under the conditions existing in his plant.

#### USE OF CORN-SIRUP SOLIDS AS A PROTECTIVE COATING

Several tests in which salmon steaks and fillets were dipped in dense solutions of corn-sirup solids before being wrapped and frozen indicated that the coating was effective in minimizing oxidation of surface meat during storage at 0° F. Cooperative tests with a local fish processor and separate laboratory studies were conducted in which both fresh salmon and frozen dressed salmon were used for preparation of steaks and fillets. These steaks and fillets were dipped in solutions of 30-, 45-, and 65-percent corn-sirup solids (by weight), drained briefly, wrapped with MSAT cellophane, and packaged in waxed cartons. These samples along with untreated ones were frozen and stored in either commercial or laboratory storage at 0° F. The samples were examined at intervals, in the thawed and cooked state, by an experienced panel at the Laboratory.

In those series in which the fresh salmon were used, the coating was noticeably effective in minimizing the fading and discoloration of the astacin pigments in the surface meat. The coating had the additional effect of enhancing the red or pink meat color because of the glossy surface. At later periods during storage when the surface fatty layer of the untreated salmon became both yellowed and definitely rancid, it was found that the fat of the treated salmon had little or no yellowing and rancidity. In one series in which silver salmon steaks were examined periodically, for example, after 8 months, the treated steaks were given definitely superior ratings for color and flavor, as contrasted to the untreated steaks. After 12 months, the treated steaks were still palatable, whereas the untreated steaks were unmarketable because of rancidity in the fatty layer and discoloration. The panel preferences were usually in the order of steaks treated with solutions of the highest percentage to the lowest percentage of corn-sirup solids, followed by the untreated steaks. In another series of tests conducted during a second year in which king salmon steaks and pink salmon fillets were used, the results confirmed the findings in the first year.

In contrast to these favorable results with fresh salmon, the use of the coating was not effective uniformly for packaged salmon prepared from previously frozen

dressed fish, which in some cases had been frozen 5 or 6 months. Two factors enter into this observation: (1) any protective coating that delays or inhibits oxidation can function best if it is added before any oxidation has taken place and (2) in the application of the dip to steaks sawed from frozen salmon, the coating does not appear to be absorbed and distributed effectively in the frozen fish meat. Evidently, the moist resilient meat of the fresh fish permits a much more intimate absorption and distribution of the coating in the surface meat, an effect that is probably increased by the subsequent pressure applied during wrapping and freezing.

In a study of the percentage of corn-sirup solids to use in commercial application, it appeared that 65-percent was too high--even though an excellent preservative effect was found. The coating, with this percentage, detracted from the appearance when the fish were unwrapped and prepared for cooking. Another somewhat objectionable feature of the coating with 65-percent corn-sirup solids was the charring of the solids around the edges of the fish when they were baked for evaluation of flavor. Although the normal flavor of the subsurface meat was not affected by the coating, tasters noted a slight semisweet taste in the surface meat of the cooked, unseasoned fish. This taste was not objectionable.

These factors were present to a lesser degree in steaks treated with the 45- and 30-percent coating. From a commercial viewpoint, the 30-percent coating would be more desirable to minimize these slightly adverse features, would be more economical because of lower pickup, and yet would provide a reasonably effective coating with fresh salmon or other fish in which surface oxidation is a problem.

Limited data were obtained on the weight pickup of the coatings by the fish, using a dip time of approximately 10 seconds. One test showed approximately 0.5 ounce of coating pickup from the 30-percent corn-sirup solids solution per pound of fish dipped, when samples of fish were used in which there were 2 to 4 portions per pound. Based on the current local price of \$9.37 for 100 pounds of corn-sirup solids (42 D.E.), the actual coat of material would be about 0.1 cent per pound of fish. A slight additional labor cost also would have to be included.

#### USE OF CORN-SIRUP SOLIDS IN GLAZING FROZEN FISH

Frozen whole or dressed fish are dipped usually in cold fresh water to produce a surface ice glaze that protects the fish from drying during cold storage. Similarly, packaged fish and shellfish, such as steaks cut from frozen dressed salmon, often are glazed before being packaged. In the improvement of the glaze by the addition of modifiers to the glazing water, the most important need is to produce a more resilient and lasting glaze that will not crack, break off, and evaporate (sublime) as readily as does a pure ice glaze.

In our tests, a 2- to 3-percent solution of corn-sirup solids was found to produce an excellent glaze with the resilient properties desired for glazing dressed fish directly from the freezer. The glaze is transparent and resists cracking caused by changes in temperature. The modified glaze does not evaporate as readily as does a pure ice glaze during long cold storage, and the reduced rate of evaporation will result in better keeping quality of the product. Either corn-sirup solids or dextrose may be used. They are not necessarily superior to other glazing additives but they have the virtues of being convenient, economical, and definitely harmless.

#### USE OF CORN-SIRUP SOLIDS OR DEXTROSE IN IMMERSION FREEZING

Corn-sirup solids or technical-grade "dextrose" (often called glucose but usually called "crude corn sugar" in the trade) may be used in high concentration in salt brines to produce an immersion-freezing solution of desirable characteristics. The salt and corn-sirup solids lower the freezing point of the solution, and the corn-sirup solids or glucose minimize the absorption of salt into the product being frozen.

Work at the Boston Fishery Technological Laboratory (Peters and Slavin 1956, Slavin and Peters 1958) demonstrated that a solution of 34-percent glucose and 12-percent salt (by weight) could be chilled to 0° F. and used satisfactorily to freeze lobsters. In other tests, a solution of 20-percent glucose and 20-percent salt was used for immersion freezing of scallop meats with good results. In the tests with scallops, Slavin (1958)<sup>1</sup> reports that scallop meats frozen in the 20 percent glucose-20 percent salt solution had a salt content before thawing of 1.1 percent. The meats frozen in 22-percent salt brine had a salt content before thawing of 3.5 percent. Previously, modified brines have been used to freeze other foods by immersion. In the Gulf of Mexico area, for example, glucose-salt brines have been used successfully to freeze shrimp aboard fishing vessels (Anonymous 1955).

Recommendations apply to freezing in modified brines that are similar to those applying to freezing in straight salt brine. The product should be chilled thoroughly before being frozen. Either agitation of the brine or movement of the product through the brine is necessary for efficient freezing. The brine should be chilled to 0° to 5° F. and maintained at 10° F. or less during the freezing process in order to minimize the absorption of salt.

If the product to be immersion frozen is wet and thoroughly chilled prior to being immersed, an ice glaze quickly forms on the product. This glaze is formed essentially by the wet surface of the product but does contain a small amount of salt and any other additive in the brine. During long storage, it is important to protect the product from loss of this glaze by packaging or by renewal of the glaze. Otherwise, the salt absorbed in the surface meat tends to accelerate discoloration, drying, and oxidative changes in flavor.

Tests at the Seattle Fishery Technological Laboratory have demonstrated that certain products may not be immersion-frozen with good results even in the modified brine. Pacific oyster meats were frozen in solution (1) of 20-percent corn-sirup solids and 20-percent salt, (2) of 34-percent corn-sirup solids and 14-percent salt, and (3) of 20-percent corn-sirup solids and 10-percent salt, at temperatures of 0°, 10°, and 15° F., respectively. The oyster meats absorbed salt too readily even during the short period required for freezing. In addition, the exterior surface of the immersion-frozen oysters became very soft when the oysters were thawed. Discoloration and oxidation of the oysters occurred during frozen-storage periods of only 4 months at 0° F. These results suggest that experimental trials with each type of product should be made to determine the effect both of the immersion-freezing and of the subsequent cold storage.

#### SUMMARY

Corn-sirup solids and commercial-grade dextrose (crude corn sugar) were found to have desirable properties for the following three applications as food additives or modifiers in packaging and freezing of fish: (1) as a protective coating in dense solution for treatment of fresh steaks and fillets before they are packaged and frozen, (2) as a glaze modifier in dilute solution for producing a resilient glaze on frozen fish, and (3) as a modifier in dense brine solutions for minimizing absorption of salt during immersion freezing of fish and shellfish. It was suggested that the protective effect in minimizing oxidation in frozen packaged salmon is due not only to the physical barrier to absorption of oxygen at the surface of the fish but also to an antioxidant or inhibiting effect of the polyhydroxyl compounds in corn sirup solids. Tests in the use of both corn-sirup solids and dextrose in salt brines used for immersion-freezing demonstrated that actual trials are necessary to determine the feasibility of use with each particular fishery product under the specific conditions met in each plant.

<sup>1</sup>/ Personal communication from Joseph W. Slavin, Fishery Technological Laboratory, Boston, Mass.

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## HANDLING FROZEN FOODS AT RETAIL

A recent study by the University of Massachusetts Extension Service at Amherst, Mass., includes excellent suggestions for the maintenance of quality.

The food retailer that consistently sells quality frozen foods will have a higher sales volume, more rapid turnover, add higher profits. However, quality can be assured only if the merchandise is properly handled at the retail level.

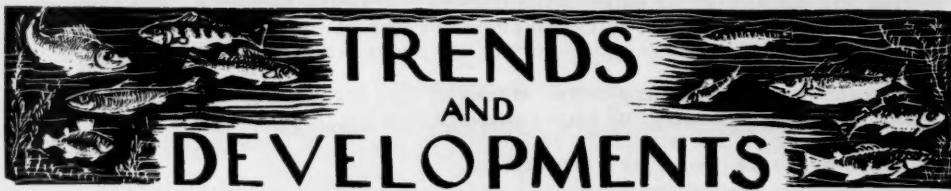
In order to assure handling efficiency in the frozen foods department, it is important that one person be assigned the responsibility of ordering, stocking, rotating, and the care and cleaning of the frozen food displays and storage.

Here are some pointers which will help personnel handling frozen foods:

Receiving Deliveries: Always be ready for the delivery and have space available for the merchandise to be placed under refrigeration. Exposure to high temperature means a loss of quality and product.

Handling in Zero Storage: Segregate merchandise as it is put into cold storage. Keep carton labels visible or mark visible ends of carton. This saves a lot of employee time when it comes to stocking frozen food cases.

Care of Display Cases: Do not stock the merchandise too tightly into display case, because it is difficult for customers to get at the merchandise, and often results in torn packages, bent cans, and disarrangement.



# TRENDS AND DEVELOPMENTS

American Fishery Advisory Committee

INDUSTRY AND INTERIOR DEPARTMENT VIEW COMMON FISHERY PROBLEMS: The recent "Industry-Interior" discussion on how to fit the commercial fisheries into the America of the future should prove a fitting note on which to end the old year and begin the new, according to Assistant Secretary of the Interior Ross Leffler in an end-of-the-year statement on commercial fishing.

Assistant Secretary Leffler's reference was to the most recent meeting of the American Fishery Advisory Committee. At this meeting, numerous long-range problems were discussed with the Bureau of Commercial Fisheries, United States Fish and Wildlife Service; several of the Bureau's current programs also were reviewed.

The Bureau is already working on some of the matters discussed and has "tagged" other problems for consideration at some appropriate time in the future. The Advisory Committee was created by the Saltonstall-Kennedy Act of 1954 for the betterment of the domestic commercial fishing industry.

Among the problems discussed were: the effect of a 12-mile fishing limit, the effect of industrialization and subdivision on estuarine habitat, improvement of fish stocks by cross-breeding or selective breeding, the effect of "fish farming" upon the commercial fisheries, the need for more research on processing and preserving, the changing food habits of the consumer, the problems of foreign trade, and developing new uses for industrial fishery products.

One of the more urgent matters which will have lasting effects on commercial fisheries relates to the rapid removal of estuarine areas which is in progress in this country. Industrial construction, navigation channeling, and real estate projects are altering or reducing the coastal marshes, rivers, and estuaries which are important areas for the spawning and rearing of fish and shellfish. Committee members urged an aggressive Federal-State program to halt the destruction of coastal marshlands until the full damage to fish and wildlife could be assessed and rectifying measures taken. The Fish and Wildlife Service has already begun a joint program with States on this matter.

The threat of other countries extending their territorial limits to 12 miles as far as fishing is concerned was discussed at length. Committee members recommended that the Department of the Interior work with other Federal agencies to try to hold to the present three-mile limit.

The Committee also urged the Department to use its energies and influence to get foreign markets open to American-produced fishery products. Trade specialists should evaluate foreign markets, efforts should be increased to eliminate trade barriers, balance-of-payment restrictions should be overcome, the fishing industry should be urged to exhibit in foreign trade fairs, and more favorable shipping rates should be sought.

The Committee reviewed the presently developing fish-farming-on-rice-lands trend in the United States and the possible effects of a potentially large production

of catfish and buffalofish on established fishery marketing patterns. The Committee requested that the Bureau of Commercial Fisheries follow the development of this young industry and present a report on its progress at a future meeting.

Suggestions for developing better stocks of fish and shellfish through cross-breeding, selective breeding, or importation of foreign fish were generally approved, especially with regard to shellfish, and declared worthy of consideration after some of the more pressing problems were settled.

Mechanization of the fishing industry was listed as a problem for the industry itself, but the Bureau was urged to keep up its pioneer work in this field. Bureau programs include the introduction of the Gulf of Mexico shrimp trawl to the west coast, efficiency studies on equipment used in shellfish predator control, and a safety-at-sea program which should not only eliminate much human suffering but also save vessel owners insurance money.

Another consideration for future action, in the form of a pilot study, is the proposal to determine eating patterns of the populace and to predict fish consumption for years to come, somewhat similar to studies being made on agricultural products.

The Committee expressed interest in dehydrofreezing and dehydrocanning work which is now being done on agricultural products. It urged the Bureau to watch developments in this field but to avoid initiating costly experimentation. Under the dehydro processes, the agricultural product is partially dehydrated and then frozen or canned.

The meeting was opened with formal presentations by Bureau personnel on the shrimp program in the Gulf area, fishery problems in the atomic age, fishery products standards and inspection, and market promotion.

Assistant Secretary Leffler stated that the advice and counsel supplied by the Committee was of tremendous value to the Department of the Interior. He was pleased that the Committee was complimentary of the work being done by the Bureau. The next semiannual meeting of the American Fisheries Advisory Committee will be held on May 6, 7, and 8 in Duluth, Minn. Previous meetings have been held in Washington, D. C.; Boston, Mass.; Long Beach, Calif.; Chicago, Ill.; Biloxi, Miss.; Ketchikan, Alaska; and San Francisco, Calif.



California

AERIAL CENSUS OF COMMERCIAL AND SPORT FISHING CONTINUED: Airplane Spotting Flight 58-21: Coastal waters from Monterey to the Russian River were surveyed from the air (November 17, 1958) by the California Department of Fish and Game Cessna 180 (3632C) to determine the fishing localities of the central California crab fleet and to determine the distribution of pelagic fish schools within the survey area.

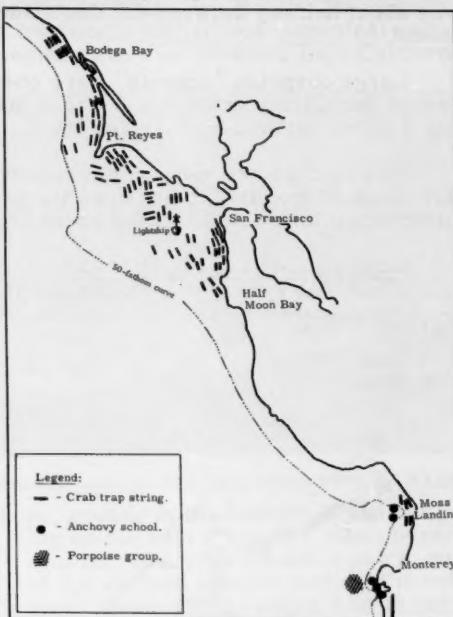
Excellent weather and sea conditions greatly facilitated observations of crab-trap buoys. Although effort was concentrated between the Russian River and Half Moon Bay and in the Monterey Bay area, a cursory inspection was made between Half Moon Bay and Santa Cruz.

A total of 97 trap strings were sighted between Half Moon Bay and the Russian River and five in Monterey Bay near Moss Landing. A census of gear units was not taken because of time limitations.

Five anchovy schools were observed in the Monterey Bay area. These schools were small in size.

Airplane Spotting Flight 58-22: The inshore area from Monterey to the Mexican Border and the Channel Islands was surveyed from the air (December 2-3, 1958) by the Department's Beechcraft to (1) locate specific areas of commercial abalone diving activities; and (2) determine the distribution and abundance of pelagic fish schools in the area south of Point Conception offshore and among the Channel Islands.

Almost all of the commercial abalone diving was confined to the Channel Islands where five diving boats were observed. Two were operating on the south side of Santa Cruz Island, about midway between Gull Rock and the east end of the island. Two were operating on the west side of San Clemente, about five miles south of the northern tip of the island, and one on the offshore side of Santa Catalina Island near Catalina Harbor. San Miguel Island was not checked because of Navy restrictions and San Nicholas was not checked because of military restrictions.



**Fig. 1 - Airplane Spotting Flight 58-21 (November 17, 1958).**

The only diving activity along the mainland coast was a single boat working in the vicinity of Goleta, Santa Barbara County. North of Point Conception the water was too rough and dirty for diving.

Kelp beds that had been extensive in the San Simeon, Cambria, Morro Bay region prior to the influx of warm water during 1957 and 1958 have not been re-established as yet.

A total of 25 anchovy schools, 2 large schools of sardines, 4 groups of porpoises, and many "working" birds were seen during the flight of December 3.

Of the anchovy schools, 20 were present in Los Angeles-Long Beach Harbor, 4 were close to shore at the east end of Santa Catalina Island, and 1 was off False Point near La Jolla. The anchovies off La Jolla were accompanied by larger fish which in turn were being fished by several sport boats, a gill netter, and a troller.



Fig. 2 - Airplane Spotting Flight 58-22 (December 2-3, 1958).

One sardine school was seen 3 to 4 miles off the Coronado Strand and the other was about halfway between the Coronado Islands and the east end of San Clemente Island.

Large porpoise "schools" were observed two miles off Del Mar, 15 miles southeast of San Clemente Island, between San Clemente Island and Santa Catalina Island, and 3 miles northwest of Avalon Bay.

No schools were seen on the return leg of the flight from Long Beach to Morro Bay; from Morro Bay to San Jose the flight was inland, rough water making further observation impractical on the coast line.

Airplane Spotting Flight 58-23: The inshore area between Carmel and the Russian River was surveyed from the air (December 8-9, 1958) by the Department Cessna 180 (3632C) to determine the distribution and abundance of pelagic fish schools, sport fishermen, abalone pickers and clammers, and to record the distribution of crab traps within the boundaries of the area surveyed.

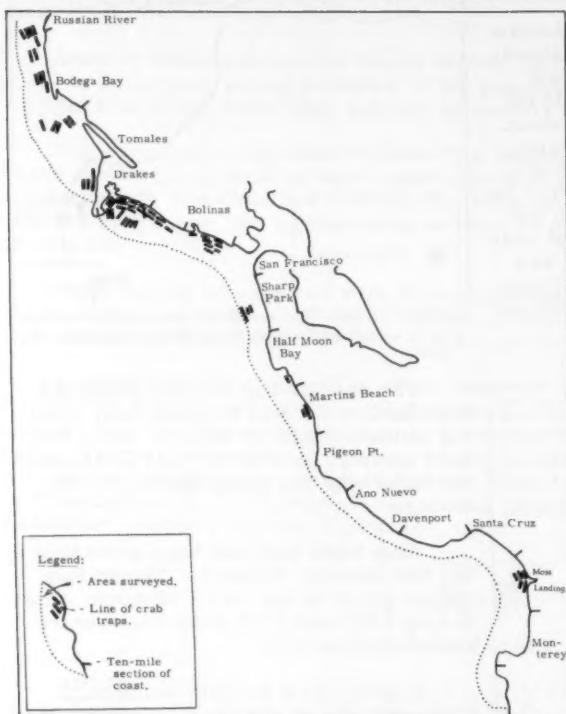


Fig. 3 - Airplane Spotting Flight 58-23 (December 8-9, 1958).

Ninety-two were tallied between Carmel and Montara with the largest numbers at Ano Nuevo Point and Pigeon Point.

**SHORE FISHERMEN:** The numbers of shore fishermen decreased sharply this flight. Now that the striped bass have moved into the delta area very few surf fishermen are utilizing the San Francisco beaches. Most of the surf fishermen on this flight were tallied in the Santa Cruz-Moss Landing area.

**CRAB TRAP DISTRIBUTION:** The location of each line of traps is shown on the map. The largest concentration was in the Pt. Reyes-Bolinas area.

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**DISTRIBUTION OF BARRACUDA AND WHITE SEA BASS SURVEYED OFF BAJA CALIFORNIA (M/V Alaska Cruise 58A6-Barracuda-White Sea Bass):** To explore for occurrences and concentrations of adult barracuda (*Sphyraena argentea*) and white sea bass (*Cynoscion nobilis*) in the coastal waters off western Baja California, Mexico, from Ensenada south to Almejas Bay was the principal objective of the October 3-25, 1958, cruise of the Alaska, research vessel of the California Department of Fish and Game. Other objectives were (1) to explore for nursery grounds of these species; (2) to collect samples of barracuda and white sea bass for various biological studies ashore; (3) to conduct a pilot tagging experiment on barracuda; and (4) to collect and save other species as time and condition permitted.

Gill nets were the principal tool used in exploring for barracuda and white sea bass. The usual routine was to fish 2 to 4 nets in an area, setting in the late afternoon and picking up the next morning. When possible similar nets were fished in pairs, one at the surface and one just off the bottom. Water depth ranged 3 to 12 fathoms. Sets were usually in or near kelp beds although several were made over sandy bottoms. All sets, except one, were anchored at both ends. The nets were cotton, linen, or nylon and of either uniform or variable mesh.

Fig. 1 - California Department of Fish Game's research vessel M/V Alaska.



Other fishing methods included rod-and-reel with live bait or artificial lures; blanket-net fishing under a 1,500-watt light suspended several feet above the surface of the water; dip-netting; and brailing.

Adult California barracuda were taken with gill nets and rod-and-reel, or observed under the night light, in the coastal waters from Todos Santos Bay to Knepper Shoals just south of Abreojos Light. The area from Cape Colnett to Point Baja appeared to be the most productive. The largest catch was made at San Martin Island. Surface water temperatures ranged from 18.9° C. to 20.9° C. (66.0° F. to 69.6° F.).

The only fish of the 1958 year-class was a small specimen taken in Todos Santos Bay by dip net under the night light. At Knepper Shoals two species of barracuda were taken, the California

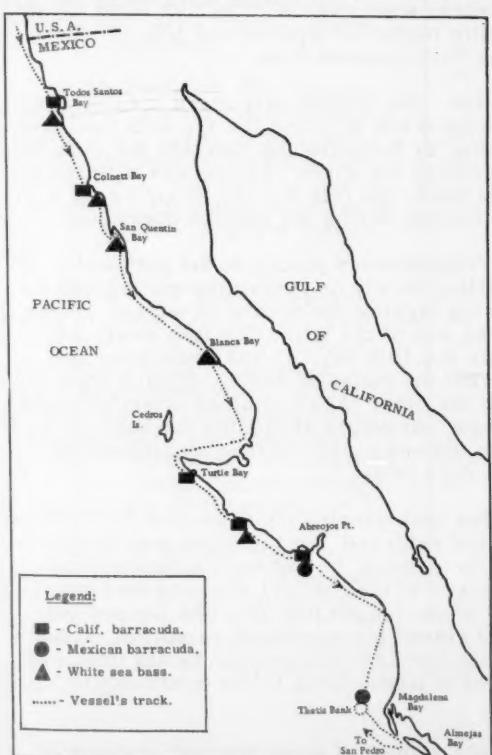


Fig. 2 - Alaska Cruise 58A6 - Barracuda and White Sea Bass (October 3-25, 1958).

barracuda and a species that has been known for 20 years but not yet described. The latter was also taken at Thetis Bank a few days later and about 120 miles further south. The taking of both species in the same area is not new, having been noted on previous surveys. Surface water temperatures were  $6.2^{\circ}$  C. to  $11.4^{\circ}$  C. warmer in this area than in the San Martin Island area. They ranged from  $25.7^{\circ}$  C. to  $26.7^{\circ}$  C. ( $78.3^{\circ}$  F. to  $80.1^{\circ}$  F.).

White sea bass were taken at only five widely separated stations between Soledad Bay and Asuncion Island. All were caught in gill nets fishing near the bottom in about 30 feet of water. Adult fish, ranging in total length from 85.5 to 136.0 cm., were taken only in northern Baja California. At these stations, Soledad Bay, San Jacinto Point, and Hondo Canyon, the nets were fished in or adjacent to kelp beds. The largest catch was made off Hondo Canyon, San Quentin Bay in a dense stand of kelp. A good catch of young fish, 36.0 to 50.3 cm. total length was made in a deteriorating kelp bed on the south side of Asuncion Island. A single juvenile, 15.6 cm. total length, was taken at Blanca Bay in a set over sandy bottom. Surface water temperatures where adult sea bass were caught ranged from  $19.8^{\circ}$  C. to  $22.0^{\circ}$  C. ( $67.6^{\circ}$  F. to  $71.6^{\circ}$  F.), while the young fish were taken in slightly warmer water,  $21.9^{\circ}$  C. to  $24.8^{\circ}$  C. ( $71.4^{\circ}$  F. to  $76.8^{\circ}$  F.).

At San Martin Island, on October 9, a pilot tagging experiment was conducted on barracuda to develop handling techniques and to observe tag retention of a new dart-type tag. The head of the tag was made of a hard plastic with one barb. The body, which carried the legend, was a 6-inch piece of flexible plastic tubing, size #19. Tags were applied with a hollow stainless steel needle. The fish were caught with rod-and-reel on bone jigs, red and white feathered squids, and live sardines. Most of the hooks were barbless or had the barb pinched down.

The fish were lifted aboard by the leader. The tagger suspended the fish over the ship's well, holding the leader with one hand and applying the tag with the other in a swift jabbing motion. Release was either by lowering the fish into the tank and allowing it to shake the hook loose or by rotating the shank 180 degrees with the aid of another hook which took the strain at the bend, the fish usually dropping off with ease. In general, the barracuda were not touched during the tagging operation.

A total of 26 tagged and 1 untagged barracuda were placed in the port well. All except one adjusted readily to the tank, milling slowly or remaining motionless for long periods. Those that were handled during tagging operations developed fungus infections which, however, cleared up by the end of the trip. One fish swam as though it had a back injury until it died after the 10th day. It was recovered and preserved for study but autopsy did not reveal the cause of death. After 8 days one tag was seen on the bottom of the tank. All the other tags remained intact until the end of the trip, a total confinement of 18 days. Attempts at feeding the barracuda dried trout food were unsuccessful and they did not appear to feed on pinhead anchovies which were added to the tank a few days later.

On October 20 a dolphin was added to the tank causing considerable disturbance. Two barracuda jumped out, one was found and returned, but the other was undetected for several hours. With the addition of the dolphin the barracuda commenced milling at the top of the tank (the dolphin stayed at the bottom) whereas they previously had milled near the bottom. Autopsy of the tagged fish that had jumped out and died revealed that the tag had been well placed for maximum retention. It had gone through the muscles of the back between the first and second dorsal fins, with the barb of the dart hooked through the sheet of tissue lying in the mediosagittal plane.

While confined in the tanks the barracuda withstood some marked changes in temperature, the most notable being on the return trip to San Pedro from Almejas Bay. During the 70-hour run, the temperature dropped  $7.5^{\circ}$  C., from  $27.8^{\circ}$  C. to  $20.5^{\circ}$  C.

During the course of the cruise samples of sardines, Pacific mackerel, jack mackerel, and anchovies were collected and turned over to the Pelagic Fish Investigation for processing. A small collection of scallops, *Pecten subodous*, was made in Black Warrior Lagoon and turned over to interested museums. In all, 83 different species of fish were caught.

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#### DUNGENESS-CRAB DISTRIBUTION AND ABUNDANCE STUDIES CONTINUED

(M/V Alaska Cruise 58A7-Crab): The Northern California coastal waters from

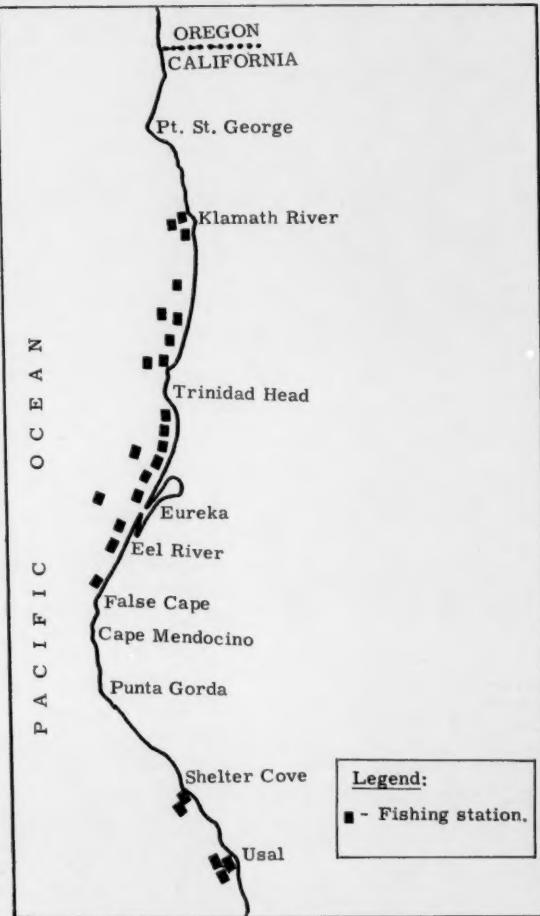
Point Arena to the Oregon border were surveyed (November 12-December 9, 1958) by the California Department of Fish and Game's research vessel Alaska. The objectives were (1) to fish for dungeness crabs, *Cancer magister*, on the fishing grounds in northern California coastal waters to determine the preseason distribution, abundance, composition, and condition; (2) to tag crabs with suture tags for migration, growth and population studies; and (3) to collect limited oceanographic data.

At 25 locations, 379 commercial trap sets were made in depths ranging from 10 to 32 fathoms. Fishing stations at the north and south extremities of the operating area were not occupied because of adverse weather and sea conditions.

Crabs were taken at each of the 25 stations fished. Of 6,165 crabs taken, 5,476 (88.8 percent) were legal males (7 inches or larger in greatest width), 672 (10.9 percent) were sublegal males, and 17 (0.3 percent) were females. Catches of legal crabs ranged from 7.5 to 25.3 a trap with an average of 14.4 for the 25 locations.

Shoulder widths made anterior to the outermost spines were recorded for the entire catch.

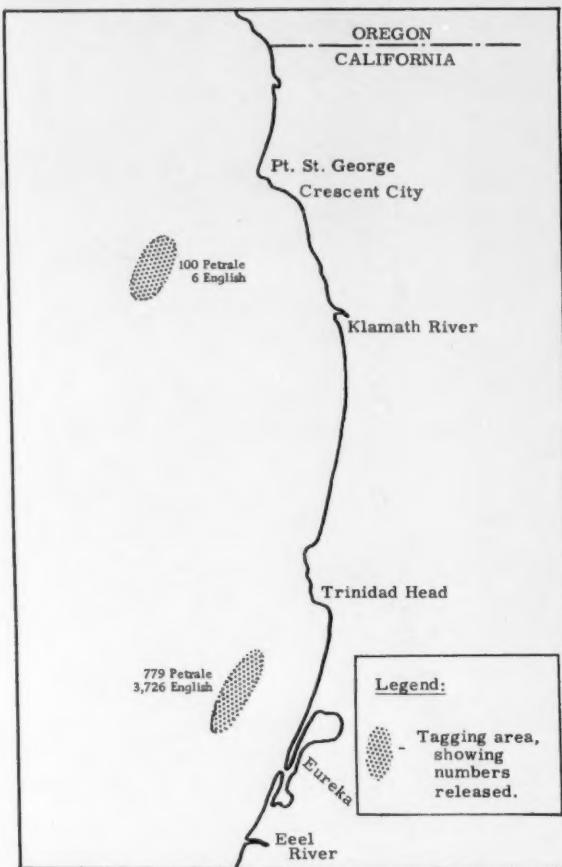
Shell condition determinations were made for all legal crabs. Soft crabs comprised only 0.7 percent of the legal-crab catch.



M/V Alaska cruise 58A7-Crab (Nov. 12-Dec. 9, 1958).

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**PETRALE AND ENGLISH SOLE TAGGED IN COASTAL WATERS (M/V N. B. Scofield Cruise 58-S-8-Trawl):** The California coastal waters from Eureka to Crescent City were surveyed by the California Department of Fish and Game's research vessel N. B. Scofield from November 8-December 16, 1958. The objectives were (1) to tag petrale and English sole with spaghetti tags; and (2) to collect specimens for various investigations and for the Steinhart Aquarium.



M/V N. B. Scofield Cruise 58-S-8-Trout (November 8-December 16, 1958).

finished the tagging operations. Valuable information on seasonal movement of English and petrale sole will be gained from these and future returns.



#### Canned Fish Consumer Purchases

**DECEMBER 1958:** Canned tuna purchases in December 1958 were 714,000 cases of which 43,000 cases were imported. By type of pack, domestic-packed tuna purchases were 160,000 cases solid, 428,000 cases chunk, and 83,000 cases grated or flakes. The average purchase was 1.8 cans at a time. Only 25.5 percent of the households bought all types of canned tuna; only 1.7 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 36.4¢ and for a 6½-oz. can of chunk 29.1¢. Imported solid or fancy was bought at 31.4¢ a can. Decem-

ber purchases were less than the 769,000 cases bought in November by about 7.2 percent. Over 38 percent of the December purchases were made in the Northeast area.

During December 1958, consumer purchases of Maine sardines were greater through the independent outlets than through the chain outlets. Canned sardine purchases in December were 131,000 cases, of which 73,000 cases were Maine, 26,000 cases California, and 32,000 cases imported. The average purchase was 2.1 cans at a time for all sar-

Canned salmon purchases in December 1958 were 208,000 standard cases, of which 115,000 cases were pinks and 43,000 cases reds. The average purchase was 1.2 cans at a time. Only 14.3 percent of the households bought all types of canned salmon; 7.4 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 56.9¢, and for red 84.5¢. December purchases were down about 22.7 percent from the 269,000 cases bought in November. About one-third of the December purchases were made in the south region.

dines, but 2.4 cans for Maine, 1.5 cans for California, and 1.9 cans for imported. Only 7.0 percent of the households bought all types of canned sardines; 4.3 percent bought Maine, 1.4 percent California, and 1.7 percent imported. The average retail price paid for a 4-oz. can of Maine sardines in oil was 11.3 cents, for a one-pound can of California 25.5 cents, and for a 4-oz. can of imported 26.9 cents. December purchases were down by 5.8 percent from the 139,000 cases bought in November.



### Cans--Shipments for Fishery Products, January-November 1958



Total shipments of metal cans during January-November 1958 amounted to 117,326 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 109,543 tons in the first 11 months of 1957. Fish canning in November was confined largely to tuna, Gulf shrimp, and California sardines.

The record pack of tuna and a substantial increase in the pack of sardines in California in 1958 account for the increase in shipments of cans for fishery products.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



**HOMEMAKERS APPRAISE CONTAINERS FOR CANNED AND FROZEN FOODS:** American housewives are satisfied with the sizes and types of containers in which canned and frozen food products are being sold.

According to a recent three-city survey by the Agricultural Marketing Service of the U. S. Department of Agriculture, most women like both cans and cartons. They point out the convenience of cans, the ease with which they can be stored, and the fact that canned goods "last indefinitely." They like frozen food containers because they're "easy to open" and "don't take up a lot of space in the trash."

There are, however, a few things the women don't like about each type of container. Some women, for instance, complain that cans are "hard to open," that frozen food cartons don't always come in enough variety of sizes.

These comments--both pro and con--came from some 1,300 homemakers in Atlanta, Ga., Kansas City, Mo., and San Francisco, Calif., who were given a chance to sound off about what they did and did not like about the packages used for canned and frozen food products.

Interviewers first asked the housewife if she preferred cans or frozen food cartons, then if she was satisfied with the sizes offered, and if the information on the labels were adequate.

The choice of whether to buy food in cans or cartons varied with the housewife and with the product.

On the question of quality, some 4 in 10 of the homemakers felt that frozen foods provide superior quality because the "freshness is preserved by the freezing process."

An additional 2 in 10 felt the canned product provided better quality; 3 in 10 were unable to distinguish any difference.

Once the selection was made between frozen and canned foods, the brand name provided the most important key to buying. Other information on the label was almost



totally ignored. Most women didn't know, or apparently care, how much the can held in actual ounces or even in the number of servings listed on the label.

Yet, almost 9 out of 10 women found the array of existing can sizes adequate for their needs. From past experience, they were able to select the right size to serve their families.

Although 6 out of 10 housewives said the size of the frozen food containers was about right, some complained that "there wasn't enough variety in the sizes offered." A few said the packages were "too small."

The women who bought frozen food, however, paid more attention to the cooking instructions and suggested recipes on the label. They also consulted the label to find out how to defrost and handle the food. Nonetheless, only about 25 percent looked beyond the brand name.

When the interviewer asked the housewife if she would prefer only the brand name on the label, most women objected. Nearly 6 out of 10 felt the maximum amount of information should be included. (Agricultural Marketing, September 1958.)



### Federal Purchases of Fishery Products

#### DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1958: Fresh and Frozen Fishery Products: For the use of the Armed Forces under the

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Market Centers, December 1958 with Comparisons					
QUANTITY		VALUE			
December	Jan.-Dec.	December	Jan.-Dec.	December	Jan.-Dec.
1958	1957	1958	1957	1958	1957
... (1,000 Lbs.) . . .	1957	... (\$1,000) . . .	1957	12,080	
1,630	1,756	22,511	23,452	883	903
1/Not available.				1/	

The value of the purchases in December 1958 was lower by 2.8 percent as compared with November and 2.2 percent less than for December 1957.

During 1958 purchases totaled 22.5 million pounds--a decrease of 4.0 percent in quantity as compared with 1957.

Prices paid for fresh and frozen fishery products by the Department of Defense in December 1958 averaged 54.2 cents a pound, about 6.4 cents less than the 60.6 cents paid in November, but 2.8 cents higher than 51.4 cents paid during December 1957.

**Canned Fishery Products:** Tuna was the principal canned fishery product purchased for the use of the Armed Forces during December. In 1958 purchases of the three principal canned fishery products were up by 56.9 percent from the 1957 purchases. Purchases of canned fish rose 117.0 percent for tuna, 17.7 percent for sardines, and 7.2 percent for salmon.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated, because it is not possible to obtain local purchases.

Table 2 - Canned Fishery Products Purchased  
by Military Subsistence Market Centers,  
December 1958 with Comparisons

Product	QUANTITY				VALUE <sup>1</sup> /	
	December	Jan.-Dec.	December	Jan.-Dec.	December	1957
1958	1957	1958	1957	1958	1957	
Tuna ..	.. (1,000 Lbs.) . . .			... (\$1,000) . . .		
Tuna ..	918	490	5,884	2,711	486	240
Salmon	-	-	3,336	3,111	-	-
Sardine	142	22	253	215	19	7

<sup>1</sup>/Values unavailable Jan.-Dec. 1957 and 1958.



### Florida

**FISHERIES RESEARCH:** The Marine Laboratory of the University of Miami carried on research on fisheries with funds provided by the Florida State Board of Conservation, the U. S. Fish and Wildlife Service, and private sources. The research of interest to commercial fisheries contained in the Laboratory's January 1959 Salt Water Fisheries Newsletter follows:

Shrimp: Important animals in the Everglades National Park estuary, both from the economic and from the scientific point of view, are the pink shrimp. They occur there in great numbers and small sizes. At times they pour out into Florida Bay, as the first leg in their migration offshore, where many of them end up in trawlers' nets on the Tortugas grounds. Collections of these small migrating shrimp are made periodically. Their change in size with the season gives an estimate of their growth, and some idea can also be obtained as to their relative abundance. It may be possible later to relate this to fishing success of the commercial boats, and thus provide a system of catch predictions.

Biologists continued to tag small shrimp in the estuary, and 383 tagged animals were released during October-December 1958. Considerably more tagged shrimp were released in the commercial fishery--2,795 in the three months. The tag consists of two small green discs, fastened to the abdomen of the shrimp with a nickel pin. Each tag is numbered and the shrimp is measured when tagged. The place of tagging is noted also, of course, so that when tagged shrimp are recovered their growth and movements while at large can be determined.

Returns of tagged shrimp have been lower in recent months than they were in the first period of tagging. Part of this is probably due to a less intense fishery, but it is suspected that the interest of fishermen may also have slackened.

It is important that every tagged shrimp caught be reported, so the reward has been doubled to \$1.00. In addition, a \$100 prize is being offered for one tag, to be drawn from all those returned from November 1 to April 1. A new \$100 prize will be offered every six months thereafter.

Sea Trout: Sea trout continue to be tagged with internal tags, as well as "anchor" tags. The internal tags consist of a piece of green plastic, with a number. These are inserted in a body cavity of the fish through a small slit made by a scalpel. The anchor tags are the same except that a piece of yellow plastic string is attached to the tag and protrudes through the hole in the fish's abdomen, calling attention to the tag. It is hoped that more tags will be recovered through this device. So far 10 tagged trout have been recaptured, and this is a good return from internal tags, which of course are difficult to detect.

So far little movement has been shown by tagged trout (the greatest was 14 miles), but this may be because they were free only a short time. An average growth of 0.21 cm. per month was shown.

\* \* \* \* \*

GRANT RECEIVED FOR RESEARCH ON CUSK EELS: A grant of \$9,000 has been awarded to the University of Miami, Fla., by the National Science Foundation for the support of basic research on the fish family Ophidiidae, more commonly known as cusk eels. The research will be under the direction of C. Richard Robins, curator of fishes at The Marine Laboratory of the University.

Cusk eels are commonly taken in shrimp trawls in tropical and semitropical waters and in Chile three members of the family are important food fishes. Quite a few are caught by anglers in the Miami area.

Though they bear the name cusk eels, they are related neither to eels or to the cusk (which is a member of the cod family). However, they are a long, slender fish bearing a slight resemblance to both cusk and eels. Thus the common name of cusk eels.

The research is to determine how many kinds of cusk eels there are, depth distribution, and a study of the anatomy to find out the relationship of the family to other fishes. Many have not been described scientifically.

\* \* \* \* \*

**GULF COAST HARBOR IMPROVEMENTS REPORTED ON BY ARMY ENGINEERS:** The U. S. Army Engineers have been investigating the advisability of Federal improvement of harbors and waterways for small craft along the west coast of Florida south of Tampa Bay. Public hearings were held at Venice, April 30, 1948, and January 24, 1951; Fort Myers Beach, January 23, 1950; Naples, April 25, 1950; and Englewood, April 26, 1950. A report by the District and Division Engineers is partially favorable to the improvements.

In compliance with the authorizations and with the requests of local interests as presented at the hearings, investigations were made to determine the feasibility for provision by the United States of a channel and basin 9 feet deep at Venice, a jetty-protected inlet and channel 9 feet deep at Lemon Bay, a channel 15 feet deep and a jetty at Fort Myers Beach, and a jetty-protected entrance channel 14 feet deep through Gordon Pass and a connecting channel 12 feet deep to upper Naples Bay. Based on information now available, the reporting officers' findings are as follows:

**Venice:** The authorized rerouting of the project Intra-coastal Waterway, Caloosahatchee River to Anclote River, will provide the requested channel, leaving the basin as the remaining request. Although some benefit would result from a basin, it is found that the development of appreciable barge traffic or other general commerce at this locality is unlikely and, furthermore, that terminals in the area are reasonably adequate for small craft. Provision of a basin by the United States is not economically justified at this time.

**Lemon Bay:** Construction of the authorized project Intra-coastal Waterway, Caloosahatchee River to Anclote River will improve navigable access to the local area. Provision of the requested inlet would either damage adjacent beach property or entail great expense for protective measures. The evaluated benefits are largely local in character and are insufficient to justify the cost of the requested improvement.

**Fort Myers Beach:** Federal provision and maintenance of a navigation channel would benefit the shrimp industry through reduction of boat damage and delay in an amount that would exceed the annual charges for a suitable navigation channel. Improvement is therefore economically justified.

**Improvement of Gordon Pass and the Channel in Naples Bay:** Would provide substantial benefits to fishing, shrimp, and recreational craft and to barge operation. The benefits would result primarily from reduction of boat damage and delay, and would exceed the annual charges. Improvement is therefore economically justified.

In conformance with their findings, the reporting officers recommend:

1. The adoption of a Federal project for Fort Myers Beach, Fla., to provide for a channel 12 feet deep and 150 feet wide in San Carlos Bay, thence 11 feet deep and 125 feet wide through Matanzas Pass to the upper shrimp terminals, at an estimated cost of \$168,000 for dredging and \$20,000 annually for maintenance by the Corps of Engineers, subject to certain conditions of local cooperation including a local cash contribution currently estimated at \$2,200, the final amount to be determined after actual construction costs are known;

2. The modification of the existing Federal project for a channel from Naples to Big Marco Pass to provide for a channel 12 feet deep and 150 feet wide in the Gulf of Mexico, thence 10 feet deep and 100 feet wide through Gordon Pass to upper Naples Bay, thence 10 feet deep and 70 feet wide for 400 feet to U. S. Highway 41 bridge; a turning basin 10 by 150 by 200 feet in upper Naples Bay, and a turning basin 8 feet deep and generally 250 feet wide and 670 feet long at the Municipal Yacht Terminal, at an estimated cost of \$331,000 for dredging and \$39,000 additional annually for maintenance by the Corps of Engineers, subject to certain conditions of local cooperation including a local cash contribution currently estimated at \$123,800, the final amount to be determined after actual construction costs are known.

\* \* \* \* \*

**STUDY OF MARINE YEASTS OF BISCAYNE BAY:** A grant of \$16,000 has been received by the Marine Laboratory of the University of Miami, Fla., from the National Science Foundation to continue investigation and study of marine yeasts of Biscayne Bay started in 1958 under a previous grant from the same institution.

The research, which relates to micro-organisms found in salt water, is to determine the occurrence and activity of these organisms. It is part of the microbiological research being conducted by the Laboratory.

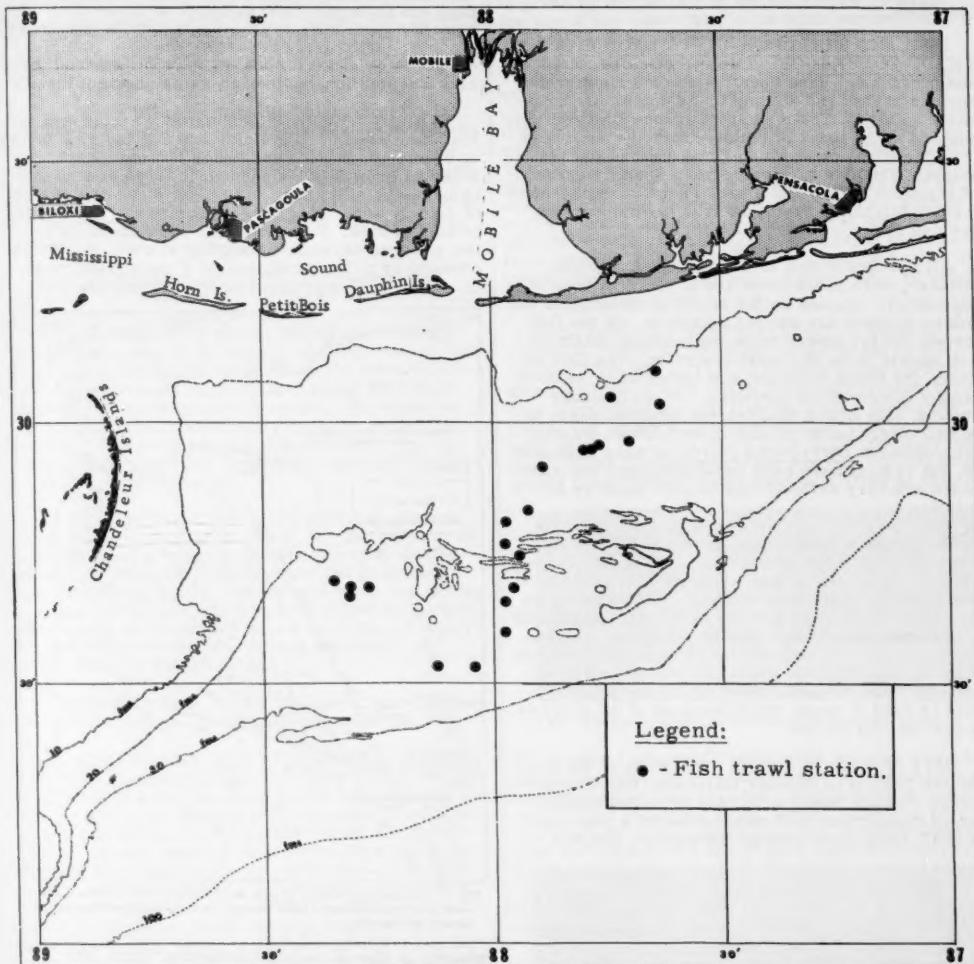
The work is being carried out by a research assistant professor on the laboratory staff and student assistants.



### Gulf Exploratory Fishery Program

**NORTHEAST GULF OF MEXICO SURVEYED FOR INDUSTRIAL FISH STOCKS (M/V Silver Bay Cruise 13):** To determine if commercial stocks of industrial fish were available, the U. S. Bureau of Commercial Fisheries chartered exploratory fishing vessel Silver Bay made 21 tows in January 1959 off the coasts of Mississippi, Alabama, and Florida. The area surveyed was on broken bottom in depths of 12-30 fathoms, which is avoided by the commercial fishing fleet. However no gear damage was suffered by the Silver Bay. An 80-foot semiballoon trawl rigged with rollers and a 50-foot square mid-water trawl (modified to fish on the bottom) were used in the fishing trials.

The principal species taken were spot (Leiostomus), croaker (Micropogon), and porgy (Stenotomus). Porgy accounted for 90 percent of the catch in depths over 20 fathoms. Individual drags yielded from 100-1,200 pounds per one-hour tow and the average was about 500 pounds a tow.



M/V Silver Bay Cruise No. 13 (January 13-15, 1959).

An extensive bed of 1-1½-inch scallops (Pecten gibbus) was located in 16-20 fathoms between Mobile and Pensacola. Numerous samples of food and industrial fish were collected and preserved for further study.



## Gulf Fishery Investigations

Following are some of the highlights of the studies conducted by the Galveston, Tex., Fisheries Biological Laboratory of the U. S. Bureau of Commercial Fisheries during October-December 1958.

**FISH AND SHELLFISH TESTED FOR INSECTICIDE TOLERANCE:** Two insecticides, dieldrin and heptachlor, have been tested on a number of species of fish and shrimp found commonly in inshore waters. The median tolerance limit ( $TL_m$ ), adopted as an index of relative toxicity, refers to the concentration at which 50 percent of the test animals are able to survive for a specified period of exposure. There is a wide range in the 24-hour median tolerance limits derived for the various species under consideration.

All species of fish tested, except the golden croaker, were more sensitive to dieldrin than to heptachlor. Studies on the effect of dieldrin on the golden croaker are not yet complete. Of the fish tested, mullet appear to be the hardest, while pinfish appear to be the least resistant. The Gulf killifish, the broad killifish, and the croaker seem to occupy intermediate positions. In preliminary studies, blue crabs (*Callinectes sapidus*) seem to be extremely hardy to both insecticides. Postlarval menhaden (*Brevoortia patronus*) have been tested, but results have been unsatisfactory; the menhaden are very delicate and make poor test animals.

On the other hand white shrimp were affected more by heptachlor than by dieldrin. Brown shrimp were more sensitive than white shrimp to dieldrin and probably heptachlor although results using the latter insecticide are not yet complete. Compared to benzene hexachloride tested last year, dieldrin and heptachlor are considerably less toxic to shrimp. Benzene hexachloride which affects shrimp at extremely weak concentrations (2-32 parts per billion) is used in many areas because of its relatively low toxicity to fish.

**BAIT SHRIMP FISHERY:** The study of the bait shrimp fishery in Greater Galveston Bay was extended through this quarter and provides an interesting comparison with data collected a year ago. In 1957, from June through November, 208,852



Fig. 1 - Typical bait shrimp stand, showing plastic containers used to measure shrimp and tank for holding live shrimp.

pounds of shrimp were caught for bait compared with 382,902 pounds caught during the same period

in 1958. Production in every month was greater in 1958. The increase may be partially due to greater efficiency in collecting statistics from bait dealers, but according to information from local bait fishermen and from our field samples at Clear Lake, this year has been very productive for white and brown shrimp, particularly the latter species. Samples have been obtained for information on size and species composition, but the data remain to be analyzed.

**SHRIMP TAGGING:** During the quarter emphasis was placed upon staining and tagging pink shrimp at Flamingo, in the Everglades National Park. Insofar as growth is concerned, it is necessary that releases be of a known size. A method was devised of quickly separating large quantities of shrimp into size groups. Essentially, it consists of using two enclosures, each consisting of a wooden frame covered by nylon mesh, one of  $\frac{3}{4}$ " stretched mesh, the other of 1" stretched mesh. Shrimp are first

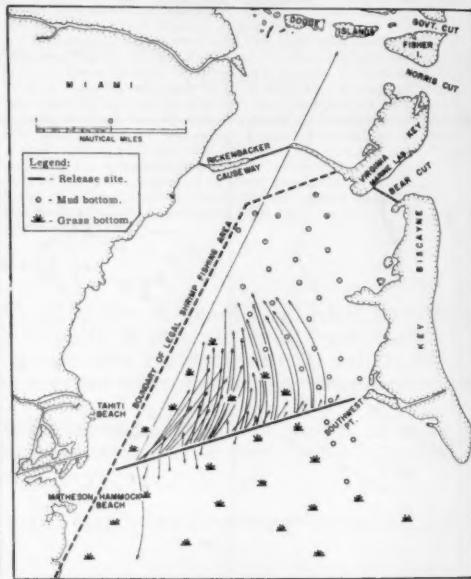


Fig. 2 - Preliminary studies of pink shrimp migration off Miami, Fla., using biological stains to mark shrimp. Arrows indicate direction of shrimp movement.

placed in the  $\frac{3}{4}$ " mesh enclosure, from which those under 13.5 mm. carapace length escape. The remaining shrimp in the enclosure are placed in the 1" mesh enclosure, from which shrimp under 22.0 mm. carapace length can escape into a large holding box. The size-separating process is more efficient when the enclosed shrimp are held in a current of water. Under this condition shrimp force their way upstream and escape more readily. Even in still water, escapement is generally through the sides of the enclosure, not the bottom.

A total of 7,264 shrimp between 13.5 mm. and 22.0 mm. carapace length were stained with Trypan Blue and released at Flamingo over a period of 10 days. During the first part of the tagging session a dye was used which had been prepared

several weeks previously--it proved exceedingly toxic and a 40-percent mortality occurred. Later a freshly-prepared dye mixture was used and mortality was reduced to 8 percent. Aging apparently intensifies the toxicity of the dye to shrimp. Those shrimp larger than 22.0 mm. carapace length were tagged using a single small Petersen disc attached with monofilament nylon. Some tagged shrimp were released concurrently with the stained shrimp, and all were released within a week of the last stained shrimp.

During the same period, the University of Miami released 200 shrimp using the conventional method of attaching Petersen discs. It is hoped that this experiment will be of value in comparing the three methods in respect to growth and movement of shrimp. Presently, effort is being directed toward the recovery phase of this marking and tagging operation.

**TORTUGAS PINK SHRIMP:** Four sampling cruises were made on the Tortugas shrimp fishing grounds during August, September, and October 1958 by University of Miami biologists under a contract with the U. S. Bureau of Commercial Fisheries. The abundance of algae on the western portion of the grounds limited the fishing effort and sampling there throughout August. The algae began to decrease in abundance early in September, and later in September the concentration was so slight that it no longer restricted the fishing effort or sampling of that area.

An airplane flight was made over the grounds on the night of August 20, 1958, for the purpose of counting fishing vessels and observing their distribution. Discard of shrimp for the purpose of maintaining particular counts was observed during Cruises 20, 21, and 22. This reflected an unusual occurrence of extremely small (10 mm.-15 mm.) shrimp found across the fishing grounds from Smith Shoal to Pulaski Light.

The Florida State Board of Conservation closed the controlled area to fishing on September 12, 1958.

**FISHING POWER AND VESSEL CHARACTERISTICS:** "Standardization" of effort statistics is facilitated if it can be determined that a vessel's fishing power is directly (and adequately) related to any one of several available vessel characteristics. Shrimp trawler characteristics being considered at present are: gross tonnage, over-all length, and horsepower. Preliminary analysis of Aransas Pass data suggest that power factors are closely related to gross tonnage and horsepower, with both acting together perhaps constituting the best indicator. A similar approach has been accorded a group of 8 standard and 17 nonstandard vessels fishing the same general area during the same period but at depths ranging from 21 to 30 fathoms. Plots of mean catch-effort ratios computed for the "standard" vessels operating in each depth range indicated little change in day-to-day relative densities of exploitable portions of the brown shrimp populations present off Aransas Pass during October 1957.

Employing an approach quite different from that used with the Aransas Pass trawlers, relative power factors were calculated for groups of 20 and 10 "standard" trawlers all fishing the Campeche Flats

together on two or more occasions during June-October 1957. Briefly, the procedure was to secure an estimate of the over-all mean shrimp density during "standard" trawler operations. Since a vessel's relative fishing power is a function of an exploited population's density, an estimate of it is given by the antilog of the difference between the log of any other trawler's catch per unit effort and the log mean relative density.

Incomplete analyses of standard trawler data with analysis of covariance techniques indicated no differences in relative population density from trip to trip during June-October, or in vessel-to-vessel mean power factors during the same period. That portion of the United States fleet commonly fishing the Campeche Flats is comprised of trawlers having rather similar specifications. This, of course, would account for the general lack of variability in relative fishing power, and, at the same time, preclude attempts to relate fishing power to vessel characteristics over a wide range of values for each of the latter.

**PRELIMINARY SURVEY OF GULF SHRIMP FISHING TRENDS, 1956-58:** Work began in December 1958 on the task of consolidating shrimp catch and effort data into a preliminary report describing Gulf shrimp fishing trends during the period for which data are available. Using Gulf-wide statistical data since 1956, a preliminary run to establish format was made for that portion emanating from United States fleet activities on the



Fig. 3 - Laboratory tests on toxicity of dinoflagellates to fish.

Campeche-Obregon (Mexico) pink shrimp grounds. Catch and effort data summed over all coastal units making up this area have been broken down by year, month, and 5-fathom depth zones. Although only partially stratified estimates, the catch-effort ratios are considered fairly good indices of relative pink shrimp abundance in the depth zones and during the periods indicated, since preliminary investigation suggested little variability in relative fishing powers of vessels fishing this general area.

Relatively little insight as to the general welfare of the Campeche pink shrimp population(s) can be gleaned from the small amount of information available. Total catch and effort data are incomplete since those originating from activities of the Mexican fleet are not immediately available. And although population densities in the "middle" depth ranges have remained fairly stable since 1956, lack of prior data obviate comparisons with levels of former abundance. However, the exploitation of pink shrimp off Campeche, insofar as the United States fleet is concerned, appears to be a marginal operation.

Other items of interest:

(a) There is a suggestion that pink shrimp in the Campeche area become increasingly abundant with increasing depth and progressing season.

(b) The annual mean size count has remained constant since 1956 (21-25 heads off). Monthly count sizes average slightly higher during the summer months (26-30 compared with 21-25 at other times) with larger shrimp generally being taken in deeper water (21 or more fathoms).

(c) Practically no pink shrimp are presently taken by United States fishermen within 12 miles of the western Yucatan coast. East of 93° W. longitude, no water exceeds 10 fathoms in depth and relatively little exceeds 5.

**RED TIDE STUDIES:** Investigations of the response of *Gymnodinium breve* to various total inorganic salt concentrations have been completed. Results show the optimal growth range for the bacteria-free organism to extend from 35 to 50 grams total salts per liter of distilled water-base medium. Within this range, high growth levels occurred in at least 15 of the 20 replicate cultures in each salinity group. Occasional instances of good growth were observed in medium containing 32 or 53 grams per liter, but none occurred in 29 grams per liter. The development of high population levels in relatively high salt concentrations suggests that salinity per se is not the limiting factor which precludes the occurrence of *G. breve* in open sea environments. However, the lower end of the tolerance range indicates that low salinity may be important in determining the distribution of this organism in estuarine environments.

A study of the effect of pH on growth of *G. breve* in 220 individual cultures shows that growth is unhampered by pH's of 7.5 to 8.2, inclusive. Growth took place at a reduced rate at a pH of 7.3, and lower values were definitely toxic. Medium having a pH of 7.2 was 100 percent lethal to this organism within 6 days, while 7.0 killed all cells within two days. Further work will be designed to show the effects of pH's above 8.2. (Values of 8.3 and 8.4 are commonly encountered in sea water.)

Preliminary experiments using constant-temperature incubators have provided some information on low-temperature tolerance in *G. breve*. A temperature of 16° C. (61° F.) produced no observable reduction in the density of cells in any of the 48 10-ml. test cultures. Over 90 percent of the organisms were killed in each of 24 cultures within 17 hours after introduction into an 11° C. (52° F.) environment. Seventeen of these cultures showed slight growth during the subsequent 12 days, but were still well below the original population level at the conclusion of the 14-day study. The other cultures exposed to this temperature did not change in regard to population after the initial decrease. Cultures of this organism are routinely kept successfully at a temperature of 25° C. (77° F.).

The last quarter of 1958 has been marked by the gradual buildup of *G. breve* in the deeper offshore waters of the Gulf off Florida and their decline in the coastal and bay waters. This indicates that, during periods of non-red tide, *G. breve* are able to maintain themselves and to approach pre-bloom stages in waters of stable environmental conditions in benthic areas. *G. breve* are now the

dominant phytoplankton in subarea 6, 10-40 miles west of Egmont Key. With the approaching winter weather and a more unstable environment the chances of a red tide developing in the coastal waters from Venice to Tarpon Springs are greatly reduced. It should be stressed that as long as *G. breve* are found in division stages in subarea 6, reseeding of the coastal and bay waters could occur next summer or fall.

**MENHADEN:** Routine sampling of the commercial catch of menhaden landed at Sabine Pass, Tex., continued until operations of the plant ended in early November 1958. Since the beginning of the season on May 5, 1958, over 900 scale samples were mounted for analysis. Reading of the 1957 scale samples for Sabine Pass and Moss Point, Miss., were completed.



Fig. 4 - Age and growth studies of Gulf menhaden.

Post-larval menhaden began appearing in local waters in mid-November. Last year they were not present until January. This might be explained by the relatively mild autumn experienced in 1957, compared to the below-normal temperatures occurring this year during the same period.

**INDUSTRIAL FISHES:** During the first few months of operation the staff at Pascagoula has concentrated on familiarizing themselves with the fishery involved and its problems; experimenting with sampling procedures to determine a sample size that will give a reasonably accurate estimate of the species composition by weight and numbers coming into the port-food plants; collecting periodical samples of various important species for life history data; determining equipment needs and acquisition of same; and setting up a procedure for collecting accurate catch and effort data from the industry and the fishermen.

To date, 52 boats have been sampled, to determine species composition of the catch by number and weight. Various numbers and sizes of samples were taken to determine a minimum sample necessary to give a valid estimate of species composition within each boat. Variation between boats and between time intervals is being tested to determine the minimum number of boats that is necessary to sample in order to obtain year-around accurate species composition breakdown by weight and numbers.

The sampling has revealed that 40 families and 65 species of mainly shallow water fish are represented in the catch here. New ones are being identified frequently, and no doubt the list will eventually include most of the shallow water and many of the pelagic species of the Gulf of Mexico.

Preparations are being made for offshore studies of midwater and surface school fish in the Gulf of Mexico during 1959, with the Bureau's exploratory fishing vessels Oregon and George M. Bowers.



### Maine Sardines

**CANNED STOCKS, JANUARY 1, 1959:** Distributors' stocks of Maine sardines totaled 268,000 actual cases on January 1, 1959--38,000 cases or 16.5 percent more than the 230,000 cases on hand January 1, 1958, according to estimates made by the U. S. Bureau of the Census.

Canners' stocks on January 1, 1959, totaled 891,000 standard cases (100  $3\frac{1}{4}$ -oz. cans), a decrease of 220,000 cases (19.8 percent) as compared with January 1, 1958.



The pack for the 1958 season (April 15-December 1) amounted to 2,021,000 standard cases as compared with 2,117,151 standard cases in the 1957 season.

Table 1 - Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1959, with Comparisons <sup>1/</sup>								
Type	Unit	1958/59 Season			1957/58 Season			
		1/1/59	11/1/58	7/1/58	6/1/58	4/1/58	1/1/58	11/1/57
Distributors	1,000 Actual Cases	268	312	184	237	293	230	298
Canners	1,000 Standard Cases <sup>2/</sup>	891	1,037	386	235	476	1,111	1,337

<sup>1/</sup>Table represents marketing season from November 1-October 31.

<sup>2/</sup>100  $3\frac{1}{4}$ -oz. cans equal one standard case.

The total supply at the canners' level as of January 1, 1959, totaled 2,434,000 standard cases or 4.3 percent less than total supply of 2,543,000 cases as of January 1, 1958. Canners' shipments from April 15, 1958, to January 1, 1959, amounted to 1,543,000 standard cases as compared with 1,432,000 cases during the same period a year earlier.

\* \* \* \* \*

**CANNERS SEEK EXPANSION OF QUALITY-GRADING PROGRAM:** Impressed with results obtained during the 1958 packing season, Maine sardine canners have asked the Maine State Commission of Agriculture to expand their mandatory quality grading program.

If the Industry's recommendation is accepted, standard quarter-size flat cans of sardines in mustard sauce and 12-ounce cans in oil will be included in the grading program for the 1959 pack. After a public hearing to be held in the late winter, a decision will be rendered by the Commissioner.

At present only standard quarter-size ( $3\frac{1}{4}$  oz.) cans packed in oil are under the program which was promulgated into action by the Commissioner in April 1958.

Meeting with the Sardine Industry Advisory Board on January 30, 1959, the Commissioner advised the group that he was in accord with the industry's request unless facts were presented at the hearing to change his thinking to the contrary.

He congratulated the packers on their cooperation in making the first year of operation of the program "such an outstanding success" and predicted that it would mean much to the economic advancement of the industry in the future.

Under the system, which was set up at the industry's request, every lot of sardines packed is graded for quality by experts at a specially-equipped and manned laboratory at Bangor, Me., and certificates of grade are issued to the canners accordingly.

According to the Commissioner, records of his Inspection Division which administers the program indicated that the over-all quality of the 1958 pack of approximately 2.0 million cases was the highest in the history of the industry.

Quarter-mustards represent about 12 percent of the industry's production while the 12-ounce oils are a newly-developed pack designed for the military, restaurant, and institutional markets. These two items, with the quarter-oils, total about 95 percent of the industry's production.

The Maine cannery made history with their program which was the first instance in the canned food business whereby an industry requested mandatory quality grading of their product. The 1957 Maine Legislature passed laws to make this possible.



### Maryland

BLUE CRAB UTILIZATION LOWER IN 1958: In 1958 the blue crab industry in Maryland used 37.4 million pounds of hard crabs (including crabs imported from other states) and 877,268 dozen soft crabs from Maryland waters, the Maryland Tidewater Fisheries Commission stated in a January 1959 release. This was a drop of about 4.0 million pounds in the quantity of hard crabs processed and a drop of 279,137 dozen soft crabs as compared with 1957. Poor weather that delayed the start of the season was blamed for the decrease.



### New York

SHIPPERS OF SCALLOPS MUST COMPLY WITH STATE REGULATIONS: Several recent shipments of scallop meats have been challenged by the Shellfisheries Management Unit of the New York State Conservation Department. The Shellfisheries Management Unit stated that: "Future shipments of fresh or frozen scallop meats into New York State for sale and distribution must be in compliance with the following minimum requirements: (1) The establishment and packing operation of scallop packers must be approved by the shellfish control authorities or health authorities of the state in which the packing takes place; (2) All containers of scallop meats must be identified to indicate the contents and the packer. (The method of identification as developed by the packer and the authorities of his state will be acceptable to this office.); (3) Scallop meats must be packed in new containers; (4) Scallop meats must be clean, free of foreign material and shall not have an excessive bacterial content; and (5) Scallop meats must be adequately refrigerated."



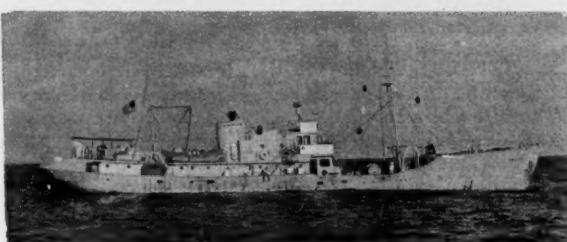
### North Atlantic Fisheries Investigations

BLOCK ISLAND SOUND AREA SURVEYED FOR INDUSTRIAL FISH (M/V Albatross III Cruise 125): To survey the Block Island Sound area for industrial fish (used for animal food or fish meal) and to determine the size distribution of the fish in two types of otter trawls was the purpose of the January 13-15, 1959, cruise of the Albatross III.

Four stations were fished with a No. 36 census trawl with a small-mesh liner in the cod end. Eight replicate tows were made alternating 2 identical No. 36 otter trawls except for the cod-end mesh size.

All fish caught in the tows were measured and identified. Cod were found to be the most abundant species at the inshore stations, while alewives and blueback herring were most abundant at the offshore stations.

The tests with the No. 36 otter trawls with the different mesh in the cod ends demonstrated that more fish were taken in the trawl with the smaller mesh. Alewives dominated the catches made with these two trawls.



Service's research vessel Albatross III.

### Oysters

CHESAPEAKE BAY OYSTER STUDIES: Mortalities: Serious oyster mortalities are occurring in small ocean-side bays along Maryland and Virginia shores. Studies conducted by Rutgers University under a contract from the U. S. Bureau of Commercial Fisheries indicate that these mortalities may be linked to the severe oyster kills in Delaware Bay which are believed to be caused by an organism similar in appearance to *Dermocystidium*, the organism responsible for severe losses in the Gulf of Mexico area. Hoping to confine the spread of the mortality to the presently-affected areas, Rutgers' biologists made a recommendation to the States of Maryland and Virginia suggesting that no seed oysters from these oceanside bays be transported to the Chesapeake Bay oyster grounds.

Dr. Reed Logie, oyster pathologist from eastern Canada, was brought to New Jersey during January for conferences regarding these mortalities. Similar mortalities since 1955 have caused the death of a high percentage of the oysters in New Brunswick and Nova Scotia.

Off-the-Bottom Cultch Superior to Bottom Cultch: At Smith Creek in southern Maryland in 1957 the Bureau's biologists compared the production of seed oysters produced on the bottom with that of oysters produced off the bottom.

They found that the off-the-bottom cultch generally produced many more and larger spat than did the bottom shells. They found also that the summer mortality of the original set may have approached 70 percent on the bottom but considerably less off the bottom.

Maryland Survey: Biologists of the Maryland Department of Tidewater Fisheries and Research and Education and the Bureau of Commercial Fisheries Annapolis Laboratory surveyed the major oyster bars of the Maryland Chesapeake in October. In the Upper Bay setting was nil but gradually increased southward, culminating in high counts in the strait areas of the lower eastern side of the Maryland part of the Bay.

Drills and drilled spat were encountered in Tangier Sound in small numbers as far down the salinity gradient as the most northerly station at Sharokin Shoal (16.83 parts per thousand). Tangier Sound, in general, had higher set survival than usual, resulting from either depressed drill activity or greater spatfall.

With few exceptions the condition and growth of the oysters throughout the Bay was excellent. The Potomac River, though it had a poor strike, produced large, single well-shaped oysters.

\* \* \* \* \*

EUROPEAN VARIETY THRIVES IN MAINE WATERS: The European oyster (*Ostrea edulis*) seems to have adapted well to its new environment and to occupy an unusual ecological niche. In October a survey was made of known colonies of this oyster in the Boothbay Harbor, Me., area. The present self-sustaining population is the result of the spawning of about one bushel of oysters held at the U. S. Bureau of Commercial Fisheries Boothbay Harbor station wharf nine years ago in cooperation with the Maine Department of Sea and Shore Fisheries.

The European species is well established to the extent of at least a five-mile radius of the original spawners. Some beds are fairly extensive, show good growth and good survival below mean low water, and several year-classes through 1958 are represented.

\* \* \* \* \*

STUDIES ON RAFT CULTURE: The first phase of the project of raft culture of oysters in Oyster River, Chatham, Mass., by the U. S. Bureau of Commercial Fisheries has been completed. On November 13, 1958, about 25-30 bushels of raft-grown oysters, averaging  $2\frac{1}{4}$  inches in height, were planted on the bottom. The majority of these oysters were from a 1957 set caught in Mill Creek, a tidal estuary in Chatham, and should be large enough for market this fall.

Several strings of 1956 Wareham oysters grown on rafts were planted also on the bottom. They were only a few millimeters larger than those grown from the 1957 Mill Creek set. The shell growth of the oysters suspended from raft slows down to such a rate in the second year that suspending them longer than one year is unprofitable.

In 1958 there was a 17-percent mortality among the Wareham oysters suspended since 1956. Over half of this mortality resulted from the falling of oysters from the strings. There was over a 90-percent mortality among the same set planted on the bottom.

To compare growth rates, oysters from different localities were suspended from a fiber-glass raft in Taylors Pond, Mass. Oyster set from James River, Va., Long Island, Conn., and Mill Creek and Wareham River, Mass., were used. A sample from each group was measured when shell growth ceased because of cold weather. After Taylors Pond became frozen observations on oysters kept on raft ceased but they were expected to be resumed when the ice melted.



### Pacific Oceanic Fishery Investigations

CONTRACT AWARDED FOR TEST OF COMMERCIAL LIVE-BAIT TUNA FISHING IN MARQUESAS AREA: On December 15, 1958, bids on a contract for a trial commercial live-bait tuna fishing trip to the Marquesas Islands area were opened at the Hawaiian office of the U. S. Bureau of Commercial Fisheries Pacific Oceanic Fishery Investigations. The only bidder was awarded the contract at \$24,900. The contract provides for a 30-day tuna fishing trip in the vicinity of the Marquesas Islands or until 130 tons of tuna have been caught. It is expected that this trial commercial tuna fishing trip will supply a good evaluation of that area for future commercial fishing trips.

\* \* \* \* \*

ECOLOGY OF ALBACORE TUNA: Studies on the relationships between albacore tuna and its environment by the Pacific Oceanic Fishery Investigations have lead to the following tentative conclusions:

(1) Surface and subsurface albacore generally occupy the same range of temperature, roughly within 55° F. to 65° F. and both to some extent occupy colder water with an increase in size.

(2) There is a remarkable coincidence in the distribution and relative abundance of albacore in the central and eastern North Pacific with that of the oceanographic

patterns of enrichment and of the standing crops of the trophic levels. In one case it is shown that this agreement can be quite detailed.

(3) It is concluded that the macroecology of the albacore in the area investigated is primarily governed by temperature in that its distribution is generally within a certain range 55° F. to 65° F., and its abundance associated with the patterns of enrichment within that range. This conclusion should not be extrapolated to areas outside those investigated.

Using these conclusions and other information obtainable from the literature, a unified concept of the ecology of the albacore is arrived at by hypothesizing their migrations and movements in the North Pacific. In general this hypothesis suggests that their migrations and movements are governed by the seasonal rise and fall of oceanographic patterns of enrichment.

Analyses of other species taken by albacore cruises were started in the fourth quarter of 1958. It is hoped that they will show that certain features of the albacore's ecology are more or less generally representative of those of the fish population north and northeast of the Hawaiian Island chain.

In the plankton studies evidence was found to support the hypothesis that there is a seasonal latitudinal advance of a biological frontier in the North Pacific. This frontier is composed of phytoplankton, herbivore and predator components. The relative latitudinal positions of the maxima of these components appear to be related to surface temperature. There appears to be no interrelation between these components independent of surface temperature.

\* \* \* \* \*

OBSERVATIONS ON TUNA BEHAVIOR: Tests of the effects of lampblack dye and water sprays on feeding, comparison of skipjack and yellowfin behavior, use of mullet and tilapia as chum, and the applicability of Tricaine-Sandoz as a skipjack anaesthetic were made by the Bureau's Pacific Oceanic Fishery Investigations, Honolulu, during the fourth quarter of 1958. The lampblack, water spray, and Tricaine tests gave inconclusive results; yellowfin were found to swim deeper than skipjack; and mullet proved to be good bait. Laboratory work consisted of transcribing Audograph records of observations and of separating movie film into experimental sequences.

Because its effectiveness was greatly hampered by the turbulence it produced, the underwater observation caisson was removed from the research vessel Charles H. Gilbert, and various improved methods of observing tuna were considered. These included underwater television and construction of a porthole beneath the ship's waterline. A decision as to the best method awaits comparative cost estimates.

The fishermen's belief that the offshore nehu differs from inshore nehu (an important baitfish) was investigated during the quarter. The two forms are closely related, but the offshore one is new to science.



Sardines

CALIFORNIA CATCH SAMPLES SHOW TWO DOMINANT YEAR-CLASSES: The commercial catch of sardines was slightly over 100,000 tons in 1958. Samples obtained in November from the landings showed a decrease in the numbers of larger fish, a slight increase in small fish (1957 class), and the increasing dominance

of the 1956 class. Approximately 75 percent of the fish samples were between 7 and 8 inches in standard length, and only 12 percent were larger than 8 inches. In contrast, approximately 35 percent of the fish landed during September were over 8 inches in standard length.

While fish of the 1957 class have been dominant in the catches made off Monterey, fish of the 1956 class have been dominant in the fish caught off southern California. This is not inconsistent with the Bureau's previous findings and the 1957 class may still prove to be of greater size than other recent year-classes. Normally, any particular year-class will make its greatest contributions to the class as 2- and 3-year old fish. The influx of fish of the 1956 class is somewhat of a surprise, largely because it is probably of fairly southern origin and was, therefore, not well represented in the southern California bait catch in 1957.



### Sea Lamprey

DECLINED IN CERTAIN GREAT LAKES IN 1958: Sea lampreys in Lake Michigan and eastern Lake Superior declined in 1958. Weirs operated in Green Bay and along the west shore of Lake Michigan took 53 percent fewer lampreys in 1958 than in 1957.

The decline was less in eastern Lake Superior (29 percent) than in Lake Michigan, but still was substantial. Both decreases are viewed as random fluctuations in stocks that have reached or are approaching numerical stability.



Lake trout from the Great Lakes scarred by sea lamprey.



### Shad

CONNECTICUT RIVER RUNS PREDICTED: A system of predicting the size of shad runs in the Connecticut River has been developed by the Atlantic Shad Investigations of the U. S. Bureau of Commercial Fisheries, Beaufort, N. C. The biologists predicted a run of 334,000 fish in 1958; it actually amounted to 372,000 fish. The commercial catch amounted to 126,000 fish and the sport catch 39,000 fish--or a total of 44 percent of the available fish.



## Shrimp

**UNITED STATES PACK OF MANUFACTURED PRODUCTS, 1957:** The 1957 pack of manufactured shrimp products in the United States declined about 4.4 percent in quantity, but was higher by 1.5 percent in value as compared with 1956. The most pronounced decline occurred in the pack of canned shrimp--down about 33.2 percent in quantity. This drop in the pack of canned shrimp reflects (1) the shortage of the smaller sizes of shrimp available to the canners in the Gulf area and (2) higher ex-vessel prices which diverted shrimp from the canners to the fresh and frozen packaged trade. Although the pack of fresh and frozen packaged shrimp products was down less than 1 percent in 1957 as compared with the previous year, the value was up about 5.5 percent. The trend towards ready-for-the-table products is indicated by the 25-percent increase in the 1957 pack of raw peeled shrimp.



Shrimp Product	United States Manufactured Shrimp Products, 1956-1957			
	Quantity		Value	
	1957	1956	1957	1956
.. (1,000 Lbs.) ..				.. (\$1,000) ..
<b>Fresh and Frozen Packaged:</b>				
Headless . . . . .	58,269	61,355	45,070	43,632
Peeled raw (including deveined) . . . . .	9,375	7,512	9,952	7,304
Cooked (includes peeled and deveined) . . . . .	1,444	2,237	2,488	3,101
Breaded, raw and cooked . . . . .	51,085	50,888	37,764	37,301
Specialties (burgers, cocktail, chow mein, egg roll, sticks, etc.) . . . . .	3,555	2,907	2,858	1,688
Total fresh and frozen packaged . . . . .	123,728	124,899	98,132	93,026
<b>Canned:</b>				
Wet and dry pack . . . . .	9,120	13,636	13,136	16,421
Specialties (aspic, cocktails, spreads, soups, and stews) . . . . .	123	178	159	336
Total canned . . . . .	9,243	13,814	13,295	16,757
<b>Dried, Cured, and Smoked:</b>				
Sun-dried . . . . .	347	471	561	607
Salted, spiced, and vinegar-gared . . . . .	35	23	51	26
Smoked . . . . .	42	14	52	31
Total dried, cured, and smoked . . . . .	424	508	664	664
<b>Meal, scrap, and bran . . . . .</b>	<b>808</b>	<b>1,122</b>	<b>23</b>	<b>34</b>
<b>Total all products . . . . .</b>	<b>134,203</b>	<b>140,343</b>	<b>112,114</b>	<b>110,481</b>



## Striped Bass

**FEDERAL AND STATE BIOLOGISTS TAG LARGE FISH ON POTOMAC:** Biologists from the Virginia Fisheries Laboratory, the Maryland Chesapeake Biological Laboratory, and the U. S. Bureau of Commercial Fisheries were working together on the Virginia research vessel Pathfinder on Maryland's Potomac River late in January 1959.

Long before commercial fishermen set their nets for striped bass in March, scientists were attempting to locate schools of over-wintering striped bass and tag large numbers, some of which will be caught in nets or on rod-and-reel later in the spring and summer. From tags returned by commercial and sports fishermen, scientists hope to estimate the number of large-size fish present in the Potomac and derive other biological information.



Virginia's Fisheries Research vessel Pathfinder.

The Pathfinder, her bow sheathed to protect it against drifting ice, was now stationed in the upper Potomac. Not only was her trawl net being used to locate and to supply the scientists with fish for tagging, but she also furnished living quarters.

Although piece-meal studies of striped bass have been made in both Maryland and Virginia by biologists from state and Federal laboratories, never before has so concerted an effort been made to study the habits of these fish and the extent of the fishery.



### Tuna

CALIFORNIA TUNA CLIPPER RETURNS FROM TRIAL TRIP OFF AFRICAN WEST COAST: The first trial tuna fishing trip of a California-based tuna clipper, Chicken of the Sea, off the African West Coast has been completed. Good tuna fishing grounds were located off Ghana's coast and the catch was generally satisfactory with respect to size and quality of tuna and the time required to locate and land the fish. However, the tuna clipper departed from African waters without attaining an optimum solution of the live-bait problem, the United States Embassy in Accra reported on December 16, 1958.

Future plans on the part of California operators of the clipper for this area are unknown. It is assumed, however, that the firm will take advantage of the territorial waters fishing privileges and port facilities offered by the Ghana Government for a period of one year beginning September 1958 and return with bait nets specially adapted to local conditions. The Ghana Government is eager to cooperate with the California firm in continuing the survey and hopes that these efforts will lead to the establishment of a Ghana-based tuna fishing and canning industry.

Bait problems were confirmed by a Ghana Fisheries Department officer who spent approximately two weeks aboard the tuna clipper. With respect to bait fishing, this observer stated that a number of sizable herring schools were located close to shore but in waters too deep to give satisfactory results with the clipper's shallow-water lampara nets. A local fishing firm contacted for the purpose was more successful using a deep-water purse seine. However, before the purse-seine catch could be transferred to the clipper's live bait tanks, the fish were no longer in a serviceable condition. As a last resort the tuna clipper returned to the Senegal bait fisheries off the coast of Dakar to obtain the needed supply.

Unless a more satisfactory solution of the bait problem can be found, a Ghana-based freezing and canning industry on a large commercial scale would probably not be feasible. On the other hand, the lack of shallow-water bait in Ghana waters would not necessarily rule out voyages to the African West Coast by American tuna clippers based on the eastern seaboard of the United States or in Puerto Rico.

\* \* \* \* \*

UNITED STATES CANNED PACK SETS NEW RECORD IN 1958: The pack of canned tuna and tunalike fish in the United States, Hawaii, Puerto Rico, and American Samoa in 1958 set a new record of 14.3 million standard cases, according to preliminary estimates. Record consumption is also indicated. The 1958 pack was 20 percent greater than in 1957 and the increase was reflected in all areas. California, which packs the bulk of the tuna, increased its pack in 1958 by almost 18 percent; the States of Washington and Oregon by 10.2 percent; and the Atlantic and Gulf

coasts and United States territories of Hawaii, American Samoa, and Puerto Rico by 47 percent.

A substantial amount of the canned tuna pack is produced from imported frozen tuna and tuna loins from Japan.

The pack dropped from 10.9 million cases in 1954 to 9.9 million cases in 1955, and climbed again to 11.8 million cases in 1956 and 11.9 million cases in 1957.

Imports of tuna already canned in 1958 were 2.3 million cases, also a record for imported canned tuna. This means that 16.6 cases of tuna were made available to the United States consumer during the year. Preliminary figures indicate that tuna consumption in the United States during 1958 was well over 15 million cases.

United States canned tuna stocks on hand at the end of 1958 were greater than a year earlier, but it appears that most of the gain in production and imports was consumed during the year. A study made by the Bureau in 1953 estimated that it would be 1960 before tuna consumption reached the 15.0 million-case mark, but this has been achieved a year earlier than predicted.

Bureau records also show that not only has the total amount of tuna canned each year increased but that in recent years tuna has displaced salmon as the leading canned fish on a per capita consumption basis. In 1925 the tuna pack reached a million cases for the first time. In 1935 it was twice that figure and in 1945 it had again doubled. In 1950 the pack was just short of 9.0 million cases. Data for 1957 show that the supply of tuna was 1.61 pounds per capita, that of salmon 1.01 pounds, and for sardines 0.46 pounds.

The catch of tuna landed in continental United States in 1958 was 314.0 million pounds, or 17.0 million pounds more than in 1957, but far below the record landings of 1950 when United States tuna fishermen brought 390 million pounds of tuna into American ports. The amount of frozen tuna imported for canning purposes in 1958 is not yet known, but during the first 10 months of the year these tuna imports totaled 162.0 million pounds as compared with 139.0 million during all of 1957.



### U. S. Bureau of Commercial Fisheries

**FISCAL YEAR 1958 PROGRESS REPORT:** The three-pronged effort being made by the Bureau of Commercial Fisheries to solve technological problems in processing and distributing fish and fishery products--studies of the physical and chemical property of fish; applied research to show usefulness of fish oils in diet, oil flotation, and other things; efforts to encourage faster application of technological knowledge--is pointed out in the Annual Report of the Secretary of the Interior for the Fiscal Year ended June 30, 1958.

Other activities of the Bureau of Commercial Fisheries mentioned in the report are:

1. The development of a commercial shrimp fishery off the Oregon-Washington coasts,

2. The discovery of an important shrimp fishery off the Shumagin Islands in Alaska,
3. More precise information on the fishery resources in the Gulf Stream,
4. The development of a simple telemeter which not only shows the depth of a trawl in operation but which records water temperatures,
5. Numerous studies of distribution factors, such as transportation costs and producer-consumer price spread,
6. Studies of economic factors affecting supply; wages and employment; competition of domestic fish with imports,

7. Presentation of 151 fish-cookery demonstrations,
8. Cooperation with the fishing industry in nationwide promotional campaigns to emphasize the value of fish as a low-cost, high-value food,
9. Numerous market and preference studies,
10. Continued assembling of fish production, receipts, and price data by the Market News Service and dissemination of that information to the public,
11. Continued processing of fishery loan applications which in 20 months have totaled 445 requests for \$16,000,000 in loans; 240 applications for \$6,000,000 approved,
12. Continued research which showed the value of copper ions in repelling oyster drills,
13. Search for ways to combat the devastating starfish invasion of the Long Island Sound oyster grounds,
14. Research which proved the necessity of protecting hard-shell crabs from predation during the first year,
15. Comprehensive studies on passage of fish through fishways of various widths and gradients and with various water velocities,
16. Four large-scale field tests which proved the devastating effect of the newly-developed selective poison on sea lamprey larvae without injury to native fish,
17. Underwater television studies on the behavior of cod, haddock, whiting, and flounders captured in trawl nets,
18. Additional experiments on electrical guiding of downstream migrants,
19. Intensified efforts to identify fish populations which must be studied to explain abundance variation, to forecast fishery success, and to develop new ways of managing species for highest sustained yield.

The report also showed that Alaska fisheries products (including fur-seal byproducts) in 1957 totaled 197 million pounds with a wholesale value of \$79,231,000 as compared with 229 million pounds and \$84,618,421 for 1956. In 1957, there were 23,130 persons engaged in fisheries in Alaska as compared with 24,549 in 1956.

The world's largest fish ladder, 3 miles long, went into operation at Pelton Dam on the Deschutes River.

\* \* \* \* \*

**VIRGINIA BIOLOGIST HEADS FISHERY BIOLOGY RESEARCH PROGRAM:** Dr. John Laurence McHugh, Director of the Virginia Fisheries Laboratory at Gloucester Point since 1951 and Professor of Marine Biology at the College of William and

Mary at Williamsburg, has assumed his duties as Chief of the Division of Biological Research of the U. S. Bureau of Commercial Fisheries. He replaces Dr. Albert L. Tester, who resigned several months ago to accept a professorship at the University of Hawaii.

McHugh was born in Vancouver, British Columbia, November 24, 1911. He received his B.A. and M.A. degrees in Zoology from the University of British Columbia. In 1950 he received his Ph. D. in Zoology from the University of California.

Before coming to his Virginia position, McHugh served as Research Associate at Scripps Institution of Oceanography at LaJolla, Calif., for three years and as assistant in research for two years before that. Before coming to California he served almost 5 years as an Infantry Officer in the Canadian Army. Prior to his Army service McHugh was with the Pacific Biological Station, Nanaimo, British Columbia.

McHugh is the author of 52 biological papers, some of which he co-authored with Tester when they were working together in Canada. He has done extensive herring research in the Pacific fisheries. He has several papers on sharks and some on albacore as well as other papers on fresh-water fishes. Since coming to



Dr. John Laurence McHugh.

with Tester when they were working together in Canada. He has done extensive herring research in the Pacific fisheries. He has several papers on sharks and some on albacore as well as other papers on fresh-water fishes. Since coming to

Virginia he has devoted considerable time to research on oysters, menhaden, and other Atlantic fish and shellfish. Since 1956 he has been Chairman of the Biological Section of the Scientific Committee of the Atlantic States Marine Fisheries Commission.

The Division of Biological Research is engaged in studying the fluctuations in the numbers of fish available in the various fisheries utilized by American fishermen. The purpose of the program is to recommend conservation measures which will maintain continuing production without hampering fishing operations, and to predict changes in abundance sufficiently in advance to minimize their effects upon dependent industries. The areas under study encompass the waters of the Great Lakes, the Atlantic Ocean from the Grand Banks to Florida, the Gulf of Mexico and the eastern, northern, and central Pacific. In addition to numerous biological laboratories located in strategic places along the coast lines and in Alaska, the Division has research vessels based at Woods Hole, Mass., LaJolla, Calif., Honolulu, T.H., and Juneau, Alaska.



### United States Fishing Fleet<sup>1/</sup> Additions

OCTOBER 1958: A total of 55 vessels of 5 net tons and over was issued first documents as fishing craft in October 1958. Compared with the same month of 1957,

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, October 1958

Area	October		Jan.-Oct.		Total 1957
	1958	1957	1958/1957	1957/1957	
..... (Number) .....					
New England . . . . .	-	-	11	17	19
Middle Atlantic . . . . .	1	-	12	21	23
Chesapeake . . . . .	18	11	87	93	104
South Atlantic . . . . .	12	13	122	104	130
Gulf . . . . .	16	15	247	132	166
Pacific . . . . .	7	9	103	98	102
Great Lakes . . . . .	-	-	6	5	8
Alaska . . . . .	1	1	31	47	48
Puerto Rico . . . . .	-	-	-	1	1
Virgin Islands . . . . .	-	-	1	-	-
Total . . . . .	55	49	620	518	601

<sup>1/</sup> Revised.

Note: Vessels assigned to the various sections on the basis of their home ports.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, October 1958

Net Tons	Number
5 to 9 . . . . .	29
10 to 19 . . . . .	5
20 to 29 . . . . .	8
30 to 39 . . . . .	10
40 to 49 . . . . .	3
Total . . . . .	55

this was an increase of 6 vessels. The Chesapeake Area led with 18 vessels; the Gulf was second with 16; and the South Atlantic third with 12 vessels.

Fishing craft issued documents as fishing craft during the first ten months of 1958 totaled 620 vessels--an increase of 102 vessels, or 20 percent, as compared with the same period of 1957. Of the vessels documented for fishing, 40 percent were reported from the Gulf States.

<sup>1/</sup> Includes both commercial and sport fishing craft.



### U. S. Fish Stick and Fish Portion Production, 1958

FISH STICK PRODUCTION: The United States production of fish sticks during 1958 amounted to 60.9 million pounds, an increase of 7.8 million pounds (15 percent) as compared with 1957. During 1958, cooked fish sticks (55.3 million pounds) accounted for 91 percent of the fish-stick total. The remaining 5.6 million pounds or

Table 1 - U. S. Production of Fish Sticks by Months and Type, 1958<sup>1/</sup>

Months	Cooked	Uncooked	Total
	... (1,000 Lbs.) ...		
January . . . . .	4,997	474	5,471
February . . . . .	5,488	437	5,925
March . . . . .	5,136	390	5,526
April . . . . .	4,346	509	4,855
May . . . . .	3,720	509	4,229
June . . . . .	4,223	479	4,702
July . . . . .	4,189	385	4,574
August . . . . .	3,918	440	4,358
September . . . . .	4,748	580	5,328
October . . . . .	4,901	584	5,485
November . . . . .	4,640	451	5,091
December . . . . .	5,013	346	5,359
Total 1958 . . . . .	55,319	5,584	60,903
	... (\$1,000) . . . . .		
Total Value 1958 . . .	22,516	4,318	26,834

<sup>1/</sup> Preliminary data.

Table 2 - U. S. Production of Fish Sticks, 1954-1958

Month	1958 <sup>1/</sup>	1957 <sup>2/</sup>	1956	1955	1954
	... (1,000 Lbs.) . . . . .				
January . . . . .	5,471	4,261	4,862	5,345	2,771
February . . . . .	5,925	5,246	5,323	5,794	3,180
March . . . . .	5,526	5,147	6,082	7,205	4,003
April . . . . .	4,855	4,492	3,771	5,953	3,841
May . . . . .	4,229	3,380	3,873	4,879	3,941
June . . . . .	4,702	3,522	3,580	5,392	4,381
July . . . . .	4,574	3,821	3,153	4,340	3,810
August . . . . .	4,358	4,643	4,166	4,520	4,364
September . . . . .	5,328	4,861	4,085	4,536	4,272
October . . . . .	5,485	5,162	5,063	5,261	5,637
November . . . . .	5,091	4,579	4,585	4,946	4,803
December . . . . .	5,359	4,014	4,019	4,876	4,959
Total . . . . .	60,903	53,128	52,562	63,046	49,962

<sup>1/</sup> Preliminary data.<sup>2/</sup> Revised.

9 percent was made up of uncooked fish sticks.

The year's production of fish sticks was greatest in February, when 5.9 million pounds were manufactured. March and October followed with 5.5 million pounds each.

Table 3 - U. S. Production of Fish Sticks, By Areas, 1958 and 1957

Area	1958 <sup>1/</sup>		1957 <sup>2/</sup>	
	No. of Firms	1,000 Lbs.	No. of Firms	1,000 Lbs.
Atlantic Coast States . . . . .	24	49,905	27	43,531
Inland and Gulf States . . . . .	4	6,003	5	5,084
Pacific Coast States . . . . .	12	4,995	11	4,513
Total . . . . .	40	60,903	43	53,128

<sup>1/</sup> Preliminary data.<sup>2/</sup> Revised.

**FISH PORTION PRODUCTION:** During 1958 about 21.7 million pounds of fish portions were packed. Of this amount, 91 percent consisted of breaded portions (3.4 million pounds cooked and 16.4 million pounds uncooked). Unbreaded portions

Table 4 - U. S. Production of Fish Portions (Produced from Blocks), 1958<sup>1/</sup>

Month	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
	... (1,000 Lbs.) . . . . .				
January . . . . .	316	1,446	1,762	211	1,973
February . . . . .	251	878	1,129	125	1,254
March . . . . .	351	989	1,340	131	1,471
April . . . . .	251	1,788	2,039	229	2,268
May . . . . .	246	1,061	1,307	171	1,478
June . . . . .	303	1,084	1,387	117	1,504
July . . . . .	213	1,760	1,973	188	2,161
August . . . . .	386	1,050	1,436	80	1,516
September . . . . .	155	1,274	1,429	137	1,566
October . . . . .	306	2,091	2,397	163	2,560
November . . . . .	278	1,558	1,836	143	1,979
December . . . . .	300	1,438	1,738	273	2,011
Total 1958 . . . . .	3,356	16,417	19,773	1,968	21,741
	... (\$1,000) . . . . .				
Total Value 1958 . . . . .	1,654	5,504	7,158	796	7,954

<sup>1/</sup> Preliminary data.

accounted for the remaining 2.0 million pounds or 9 percent. Production was largest during October (2.6 million pounds). April was next with 2.3 million pounds.

Fish portions are defined as uniform pieces of fish blocks, different from fish sticks in size and shape. Collection of production data on fish portions was started the last quarter of 1958.

Table 5 - U. S. Production of Fish Portions  
(Produced from Blocks), By Areas, 1958<sup>1/</sup>

Area	1958	
	No. of Firms	1,000 Lbs.
Atlantic Coast States . . . .	19	12,047
Inland, and Gulf, and		
Pacific Coast States . . . .	7	9,694
Total . . . . .	26	21,741

<sup>1/</sup>Preliminary data.

Note: During 1958, four firms produced fish portions that did not produce fish sticks.

Pacific coast areas followed with 9.7 million pounds of fish portions and 11.0 million pounds of fish sticks.

#### FISH STICK AND FISH PORTION PRO- DUCTION BY AREA:

The Atlantic Coast States led all other areas in the production of fish sticks and fish portions with 49.9 and 12.0 million pounds, respectively.

The inland and Gulf, and

Table 6 - U. S. Production of Fish Portions (Produced from Blocks),  
By Quarters, 1958<sup>1/</sup>

Period	Breaded			Unbreaded	Total
	Cooked	Uncooked	Total		
1st Quarter . . . . .	918	3,313	4,231	467	4,698
2nd Quarter . . . . .	800	3,933	4,733	517	5,250
3rd Quarter . . . . .	754	4,084	4,838	405	5,243
4th Quarter . . . . .	884	5,087	5,971	579	6,550
Total . . . . .	3,356	16,417	19,773	1,968	21,741

<sup>1/</sup>Preliminary data.



#### U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS, OCTOBER 1958: Imports of edible fresh, frozen, and processed fish and shellfish into the United States during October 1958 increased by 6.4 percent in quantity and 6.1 percent in value as compared with September 1958. The increase was due primarily to higher imports of groundfish fillets (up 5.6 million pounds) and frozen shrimp (up 3.9 million pounds), and to a lesser degree, an increase in the imports of other fillets, and canned salmon. These increases were partly offset by a 5.0 million pound decrease in the imports of frozen tuna (including albacore) and frozen salmon (down 1.0 million pounds).

Compared with October 1957, the imports in October 1958 were up by 6.0 percent in quantity and 9.0 percent in value due to higher imports of groundfish fillets, frozen tuna other than albacore (up 8.4 million pounds), canned tuna in brine, and frozen shrimp. Compensating, in part, for the increases was a drop of about 2.4 million pounds in the imports of groundfish and other fillets and frozen and canned salmon (down 3.8 million pounds).

Item	United States Foreign Trade in Edible Fishery Products, October 1958 with Comparisons			
	Quantity		Value	
	October 1958	Year 1957	October 1958	Year 1957
(Millions of Lbs.)				
Imports: Fish & shellfish: Fresh, frozen, & processed <sup>1/</sup> . . .	98.3	92.4	837.0	27.9
				26.3
				248.4
Exports: Fish & shellfish: Processed only/ (excluding fresh & frozen) . . .	11.1	4.2	69.7	5.8
				1.3
				16.8

<sup>1/</sup>Includes pastes, sauces, clam chowder and juice, and other specialties.

United States exports of processed fish and shellfish in October 1958 were higher by 164.3 percent in quantity and 246.2 percent in value as compared with September 1958. Compared with the same month in 1957, the exports in October 1958 were

higher by 136.4 percent in quantity and 246.2 percent in value. The exports in October 1958 as compared with the same month in 1957 were sharply higher due to increased supplies of exportable California sardines and Pacific salmon. The exports of processed fish and shellfish in October this year returned to a normal pattern. (October 1956 exports totaled 11.8 million pounds).

\* \* \* \* \*

**GROUNDFISH FILLET IMPORTS: Year 1958:** Preliminary data indicate that 1958 imports of groundfish (including ocean perch)

Table I - United States Imports of Groundfish  
(Including Ocean Perch) Fillets  
and Blocks, 1956-58

Country of Origin	1958 <sup>1/</sup>	1957 <sup>1/</sup>	1956
	(1,000 Lbs.)		
Canada . . . . .	103,013	108,309	99,810
Iceland . . . . .	29,141	22,283	27,178
Japan . . . . .	763	2	-
Norway . . . . .	6,201	4,590	4,124
Denmark . . . . .	9,774	3,150	3,010
United Kingdom . . .	237	77	-
Netherlands . . . . .	554	564	480
France . . . . .	91	190	919
West Germany . . . .	3,977	1,240	2,036
Greenland . . . . .	189	532	811
Miquelon & St. Pierre	709	243	321
Union of South Africa	66	-	19
Sweden . . . . .	-	-	6
Total . . . . .	154,715	141,180	138,714

<sup>1/</sup> Revised.

Notes: (1) Data on 1958 imports revised because a substantial quantity of fish bits and pieces blocks were reclassified from a different category and included under the groundfish fillet and block category.

(2) See Chart 7 in this issue.

pounds, based on a quarterly quota of 8,973,055 pounds. The quota for the calendar year 1957 amounted to 37,375,636 pounds. Imports during individual quarters in excess of the established quarterly quota enter at a duty of  $2\frac{1}{2}$  cents a pound.

fillets and blocks into the United States reached the record total of 154.7 million pounds--9.6 percent or 13.5 million pounds more than in 1957. The drop in imports from Canada was more than offset by increased imports from Iceland, Norway, Denmark, and West Germany.

**December 1958:** Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets (including blocks) into the United States during December 1958 totaled 8.0 million pounds--an increase of 952,000 pounds or 14 percent as compared with the same month of 1957.

The quota of groundfish and ocean perch fillets and blocks permitted to enter the United States at  $1\frac{1}{4}$  cents a pound in the calendar year 1958 was 35,892,221



### Wholesale Prices, January 1959

The over-all mid-month January 1959 wholesale price index for selected edible fishery products was about unchanged from the preceding month because price increases and decreases occurred over a relatively narrow range. On the other hand the January 1959 edible fish and shellfish (fresh, frozen, and canned) wholesale price index (135.4 percent of the 1947-49 average) was 9.5 percent higher than in the same month last year due to price increases for all the products in the index, except canned salmon, California sardines, and tuna.

The January 1959 price index for the drawn, dressed, and whole finfish subgroup was 1.9 percent lower than in December 1958 due to lower prices for almost all items. But compared with January 1958, the subgroup index this January remained substantially higher (30.5 percent) due to higher prices for all items included.

The fresh processed fish and shellfish subgroup index this January was higher by 4.2 percent due to an 8.0 percent increase in fresh shrimp prices at New York City and an increase of 1.6 percent for fresh haddock fillet prices at Bos-

ton. Shucked oyster prices in January 1959 were unchanged from the preceding month. The index in January 1959 as compared with the same month in 1958 was higher by 6.9 percent because fresh haddock fillet prices were up 31.3 percent, fresh shrimp prices were up 6.8 percent, and shucked oyster prices were up 2.1 percent.

The index for January 1959 for frozen processed fish and shellfish was down slightly (0.8 percent) from December 1958 due only to a drop of 2 cents a pound in the frozen 26-30 count shrimp price at Chicago. The frozen fillet prices were unchanged from mid-December 1958 to mid-January 1959. From January 1958 to January 1959, wholesale prices for the subgroup were up 5.8 percent because the prices of all products in the subgroup were higher.

In January 1959 canned fish prices were higher by 0.6 percent as compared with December 1958 due to an increase of about 50 cents a case in canned pink salmon prices at Seattle. This increase more than offset another drop in prices for California sardines. Canned Maine sardines and California tuna prices were unchanged from December 1958 to January

this year. When compared with the same month a year ago, prices in January this year for the selected canned fish items were higher by 1.5 percent due to a 32.7-percent increase in the Maine sardine prices. All other items in the subgroup were lower this January as compared with January a year ago. Primary wholesale markets for Maine sardines and Pacific

salmon remained firm, but California sardines were moving slowly and sales of tuna were maintained at a high level due only to vigorous promotion on the part of the canners. Movement of canned tuna into consumption was good because the canners were willing to lower prices in order to move large inventories which are the result of a record pack in 1958.

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices <sup>1</sup> / (\$)		Indexes (1947-49=100)			
			Jan. 1959	Dec. 1958	Jan. 1959	Dec. 1958	Nov. 1958	Jan. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned) . . . . .					135.4	134.8	128.3	123.7
Fresh & Frozen Fishery Products: . . . . .					160.6	2/160.1	147.4	140.3
Drawn, Dressed, or Whole Finfish: . . . . .					174.1	177.5	155.0	133.5
Haddock, lge., offshore, drawn, fresh . . . . .	Boston	lb.	.23	.23	232.9	235.0	152.3	152.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.34	.34	103.7	104.2	105.2	96.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.78	.79	174.1	176.9	174.1	138.8
Whitefish,L. Superior, drawn, fresh . . . . .	Chicago	lb.	.67	.75	166.1	185.9	179.7	146.3
Whitefish,L. Erie pound or gill net, rnd., fresh .	New York	lb.	.73	.90	146.6	182.0	151.7	128.4
Yellow pike, L. Michigan & Huron, rnd., fresh .	New York	lb.	.66	.65	153.6	152.4	117.3	111.4
Processed, Fresh (Fish & Shellfish): . . . . .					154.2	148.0	138.7	144.2
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.63	.62	214.4	211.0	163.3	163.3
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.95	.88	150.1	139.0	128.0	140.6
Oysters, shucked, standards . . . . .	Norfolk	gal.	6.00	6.00	148.5	148.5	148.5	145.4
Processed, Frozen (Fish & Shellfish): . . . . .					138.9	140.0	135.5	131.3
Fillets; Flounder, skinless, 1-lb. pkg. . . . .	Boston	lb.	.42	.42	108.6	108.6	108.6	103.4
Haddock, sml., skins on, 1-lb. pkg. . . . .	Boston	lb.	.41	.41	128.7	128.7	127.1	117.7
Ocean perch, skins on, 1-lb. pkg. . . . .	Boston	lb.	.31	.31	124.9	124.9	120.8	114.8
Shrimp, lge. (26-30 count), 5-lb. pkg. . . . .	Chicago	lb.	.89	.91	137.7	139.6	132.7	131.5
Canned Fishery Products: . . . . .					98.9	98.3	101.1	100.4
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	22.00	21.50	114.8	112.2	112.2	120.0
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.),								
48 cans/cs. . . . .	Los Angeles	cs.	11.00	11.00	79.3	79.3	86.2	81.8
Sardines, Calif., tom. pack, No. 1 oval (15 oz.),								
48 cans/cs. 3/ . . . . .	Los Angeles	cs.	7.75	8.25	91.0	96.9	96.9	113.8
Sardines, Maine, keyless oil, No. 1/4 drawn								
(3-3/4 oz.), 100 cans/cs. . . . .	New York	cs.	8.47	8.47	90.1	90.1	87.5	67.9

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

2/Revised.

3/Pricing beginning with January 1959 on price per case of 48 cans instead of 24 cans. Index for previous months is comparable.





## International

### FOOD AND AGRICULTURE ORGANIZATION

#### INDO-PACIFIC FISHERIES COUNCIL ANNUAL MEETING:

The Eighth Annual Meeting of the FAO-sponsored Indo-Pacific Fisheries Council opened in Colombo, Ceylon, on December 8, 1958. Forty delegates from 12 countries attended the meeting. The Council discussed, among other things, the mechanization of the fishing industry, credit facilities for fishermen, marketing, and transportation. (United States consular report from Colombo, December 12, 1958.)



**WORLD FISH CATCH IN 1957 CONTINUED TO INCREASE:**  
The world's total commercial fish catch is still increasing and is now about 30 million metric tons a year, the Food and Agriculture Organization reports in its *Yearbook of Fishery Statistics* recently published.

The latest world catch figure is 29,960,000 tons (1957), which shows an increase of almost 50 percent over the catch in 1938, the last full fishing year before the Second World War, when 20,500,000 tons were landed. Since 1947, when the catch (17,940,000 tons) still showed the effects of the war, there has been a steady increase in the total each year. The annual increase during the past five years has been about 5 percent.

World Fish Catch, 1948-57										
1957	1956	1955	1954	1953	1952	1951	1950	1949	1948	
(Metric Tons).										
29.96	28.60	28.12	26.80	24.91	24.52	22.75	20.23	19.41	19.09	

The most significant of the increases by continents since 1938 were: Africa (from 520,000 to 1,860,000 tons), Asia (9,360,000 to 12,880,000 tons), Europe (5,580,000 to 7,640,000 tons), and the Union of Soviet Socialist Republics (from 1,550,000 to 2,540,000 tons).

Japan not only continued to be the world's foremost fishing country, but was actually widening the gap between itself and the second country, the United States (including Alaska). In 1957 Japan caught 5,399,000 metric tons of fish, or just

over 18 percent of the world's total catch. The United States caught 2,741,100 tons, a little more than one-half the amount caught by Japan. Before the war (1938) Japan caught 3,562,000 tons. After 1947 Japan's catch started to increase again and reached 2,205,700 tons in that year. Since then there has been a substantial increase each year, passing three million tons in 1950, four million in 1952, and five million in 1957.

The following seven countries caught more than one million tons of fish in 1957: Japan 5,399,000 tons; United States (including Alaska) 2,741,100; Communist China (mainland) 2,640,000 (1956); U.S.S.R. 2,535,000; Norway 1,738,900; India 1,233,000, and the United Kingdom, 1,014,700. Canada (including Newfoundland), which caught 1,091,900 tons in 1956, caught only 991,700 tons in 1957. India, which just topped the one-million mark for the first time in 1956, moved two places up in 1957. However, later figures from Russia and Communist China may place these two countries in second and third place, and put the United States in fourth place.

Of the 1953-57 average annual world catch of 27,900,000 tons, six countries (Japan, United States, Communist China, U.S.S.R., Norway, and the United Kingdom) caught 55 percent. The next seven countries caught 19 percent, and the following 27 countries caught 21 percent. Thus, the 40 leading fishing countries catch 95 percent of the world's total fishery landings, while some 150 other countries only catch about 5 percent of the total among them.

The world catch by groups of species shows that there was little change in the relative percentages. Herrings, sardines, anchovies, etc., which represent 24 percent of the total catch, make up the biggest group.

There has been a great increase in canning fish products in the U.S.S.R. In 1946 the Soviet Union canned 46,000 tons, but in 1957 the figure was 229,000 tons.

### INTERNATIONAL FISH MEAL MANUFACTURERS CONVENTION

#### WORLD-WIDE CONTROL OF FISH MEAL MARKETING RECOMMENDED:

Representatives of the fish meal industries of Britain, Norway, Belgium, France, Denmark, Holland, Spain, and Iceland met in Cape Town, South Africa, in November 1958 for the International Fish Meal Manufacturers Convention.

A British fish-meal producer and 1958 president of the British Fish Meal Manufacturers' Association recommended world-wide control of the marketing of fish meal. He was also joint chairman of the International Fish Meal Manufacturers Convention.

**International (Contd.):**

After he returned from the Convention, the British producer stated in Aberdeen early in December 1958, "We have not yet reached the stage of controlling the industry, but we feel we took a step in the right direction."

It was important, he said, to protect manufacturers from too much meal reaching the market at any one time, depressing prices and harming not only themselves but other sections of the fishing industry.

The United Kingdom delegation, led by the British producer quoted, suggested a monthly exchange of market information. The idea received an enthusiastic welcome and the British producer was given the go-ahead to work out a practical scheme. He said: "It is not going to be an attempt to form a monopoly or anything like that, just an advisory body."

Britain's annual output of fish meal varies from 75,000 to 80,000 metric tons. (The Fishing News, British fishery periodical, December 12, 1958.)

**LATIN AMERICA PACIFIC COAST ALGAE BEING STUDIED**

The Beaudette Foundation for Biological Research located in Solvang, Calif., is studying the taxonomy of marine algae of the Pacific coast of Latin America with the eventual goal of adding to the food and economic resources of the countries of the area. The work is also supported by a grant from National Science Foundation.

Publication of an illustrated manual for the identification of the principal kinds of marine algae is planned, and the analysis of pure samples of the larger species of algae for caloric value, vitamin and mineral content, and the presence of highly concentrated chemical elements of extractable value and antibiotic properties. Studies will also be

made of methods of harvesting and means of simple processing of seaweeds.

**NORTH PACIFIC FUR-SEAL RESEARCH**

There was limited open-sea catching of fur seals in the North Pacific in 1958 by fisheries scientists in order to gather data on the fur-seal herds.



Designed to meet the requirements of the Interim Convention on North Pacific Fur Seals, the investigations were to study the distribution, migration, and feeding habits of fur seals by the four parties to the Convention (Japan, U.S.S.R., the United States, and Canada).

Canada's part of the program required that 500 to 750 fur seals be taken each year at sea for a period of 5 years for study purposes. During the past year 502 were actually caught for research. Similar investigations were conducted by the three other participating countries; in addition, United States scientists conducted research on the Pribilof Islands in the Eastern Bering Sea, and Soviet scientists do similar work on the Commander Island in the Western Bering Sea and on Robben Island in the Okhotsk Sea. Although the coordinated research program has only been in operation one year, interesting and valuable results have already been obtained.

The planned harvest of seals by the United States and U.S.S.R. for 1958 was

### International (Contd.):

85,000 with a value of several million dollars. The seals are taken commercially only on the summer breeding grounds on the Pribilof, Commander, and Robben Islands, and the proceeds are shared according to an agreed formula among the four governments. Actually 15 percent of the commercial crop is given to Canada and Japan each as compensation for relinquishing the privilege of taking fur seals at sea.

The North Pacific fur seal herds have been under some form of international management since 1911. The present convention was signed in Washington, D. C., February 9, 1957, by representatives of Canada, Japan, the U.S.S.R., and the United States. The convention continues the prohibition on pelagic (sea) catching of the seals and permits only controlled killing on their island breeding grounds in order to conserve and develop the herds. (Fisheries Council of Canada Bulletin, January 19, 1959.)

### TRADE AGREEMENTS

#### NORWAY-CZECHOSLOVAKIA TRADE AGREEMENT FOR 1959 INCLUDES FISHERY PRODUCTS:

Norway and Czechoslovakia agreed to continue into force until December 31, 1959, the basic trade agreement of March 20, 1947. New commodity lists were agreed to during the negotiations in Oslo in December 1958.

Norwegian exports to Czechoslovakia will include, among other products, the following fishery products: (1) fish oils, refined and technical, 6,000 metric tons; (2) medicinal cod-liver oil, 800 tons; (3) fresh, frozen, and salted herring, 14,000 tons; (4) fish fillets, 2,500 tons; (5) other fish, including mackerel and tuna, 1,000 tons; (6) canned fish, value 3,000,000 kroner (US\$420,000); (7) fish meal, 2,000 tons; and (8) pearl essence, value 1,000,000 kroner (US\$140,000).

### WHALING

#### NORWAY AND NETHERLANDS ANNOUNCE CONDITIONAL WITHDRAWAL FROM WHALING CONVENTION

The Norwegian Government took action on December 29, 1958, to notify the

International Whaling Commission of its intention to withdraw from the Convention as of June 30, 1959. The public notice of withdrawal added that it would be retracted in the event that by June 30, 1959, the nations engaged in pelagic whaling in the Antarctic had reached agree-



ment on a proportionate distribution of the maximum whale quota allowed by the Commission. This means that Norway, Japan, Britain, and the Netherlands have to agree on the allocation of the 80 percent of the total Antarctic pelagic whale catch remaining after Russia has taken 20 percent. The press reports that the whaling industry has expressed its gratification with the Government's decision to take this action. The decision will not affect whaling operations this season.

Press reports indicate that the decision to withdraw from the Convention was made as a counter measure for what Norway considers as unreasonable claims on the part of the Netherlands. The Norwegians would like to see a system of international inspection to insure compliance with the regulations made by the Commission.

The Netherlands Ministry of Agriculture, Fisheries and Food has also announced that Holland has conditionally withdrawn from the International Whaling Convention. The withdrawal will become definite on June 30 unless agreement is reached on the "so-called allocation of the maximum quota of whales caught every season."

The Dutch have long chafed at the present catch limit which Dutch biologists feel has been set unnecessarily low, thus preventing the Netherlands whaling industry from showing the desired profit.

The five nations with Antarctic whaling fleets are Russia, Norway, Holland, Japan, and Britain. During discussions in London the latter part of 1958 it was agreed that the Soviet Union should be allocated 20 percent of the catch of 15,000 units set for the season. Agreement has not yet been reached, however, on how the remaining 12,000 units should be

**International (Contd.):**

distributed among the four other Powers.

A Norwegian spokesman stressed that withdrawals would not mean a "free-for-all" in the whaling grounds but were tactical moves to strengthen the position of the nations. The Norwegian Minister for Industry said: "Norway is still interested in reaching an agreement between the four non-Communist whaling Powers on the basis of the London agreement made last November."

Talks in November and December 1958 did produce agreement among the five members of the convention to limit their fleets during the next seven years and to divide the total number of "units" permitted among the countries rather than continuing the race to see who could catch the biggest share before the total was reached. Unfortunately no agreement has been reached about the quotas for Britain, Norway, Japan, and Holland.

**Australia****REACTION TO RUSSIAN WHALING FLEET EXPANSION:**

Plans made by the Soviet Union to build 4 or 5 large factoryships to participate in whaling could seriously endanger Australia's whale stocks, according to the Commonwealth Director of Fisheries and Australian representative on the International Whaling Commission. He stated that any breach of the International Whaling Agreement could lead to unrestricted taking of whales in the Indian and Pacific Ocean.

"If Russia began to catch whales faster than anyone else, other countries would find it uneconomic to compete. The whole tendency will be to break the international agreement. This will mean that whaling in Australian waters will be finished in a few seasons," he concluded.

Australia is a signatory of the International Whaling Agreement and has not indicated any intention of withdrawing from it. However, the whaling industry is well-established both on the west and

east coasts of Australia and the Australian government may have to consider taking steps to protect it.

\* \* \* \* \*

**WHALE STEAKS FOR ANIMAL FOOD PROFITABLE:**

A Sydney, Australia, firm is offering one-pound packaged whale steaks for animal food at about 14 U. S. cents a package delivered to retail stores in refrigerated trucks for display in the retailers' cabinets. The whale steaks are resold at a retail price of about 18.7 U. S. cents a pound to yield a profit of about 33 percent. (Australian Fish Trades Review, November 1958.)

**Brazil****FISHING OPERATIONS BY JAPANESE EXPAND:**

The large Japanese fishing company, which began fishing and fish-marketing operations in Brazil late in 1957, now has 14 retail outlets in the city of Sao Paulo and is producing fish at the rate of 400 metric tons a month. The firm as yet has not started to process fish and has no refrigeration facilities.

In November 1958 the Japanese firm was granted permission by the Brazilian Government to bring four more fishing vessels to Brazil. This will give them a fleet of 10 vessels operating from Brazil. The four vessels are expected to arrive in March-April 1959.

Another Japanese fishing company has been granted permission by the Brazilian Hunting and Fishing Division of the Ministry of Agriculture to bring in fishing vessels for fishing off the Brazilian coast for two years. This new Japanese venture is reported to be tied in with a Sao Paulo organization and plans to process fish. (United States Sao Paulo Consulate report, December 22, 1958.)

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**JAPANESE FISHING OPERATIONS CONTINUE TO EXPAND:**

The Japanese-Brazilian fishing company operating out of Recife, Brazil, is associated with a large firm of Japan. It has taken over most of the facilities of the Government

### Brazil (Contd.):

fish receiving and storage plant in Recife. The facilities consist of a large building with 500 tons of frozen storage space, a 20-ton flake-ice machine, 5 compressors and, recently introduced, 1 small closing machine for canning tuna, 1 sausage grinding machine, 1 mixing machine, 2 sausage extruders, and 2 sausage cookers.

In mid-December the storage space was completely full of frozen fish, mostly yellowfin tuna (*Neothunnus*), black marlin (*Makaira*), and sailfish (*Istiophorus*). Five of the reported eight vessels fishing for the Japanese-Brazilian company were tied to the dock waiting to dispose of their cargos. It was evident that the vessels (all long-liners) were catching more fish than they could readily sell.

The company, which has been selling only frozen tuna and billfish throughout Brazil at a retail price of 30 cruzeiros a kilogram (about 10 U. S. cents a pound), was attempting to diversify its markets. A Japanese technologist was on hand. He has started the production of tuna sausages which retail at 10 cruzeiros (about 7 U. S. cents) for a 125-gram (about one fourth of a pound) sausage. In addition, equipment was on hand for canning tuna, but difficulty with Brazilian-made cans was holding up the initiation of this project. The canned tuna is intended for the local market. Experiments were also being made with salting and drying tuna in a manner similar to cod; however, the local salt was causing the fish to turn red. If the salt problem can be overcome and a suitable substitute found for cod there should be a considerable market for the product in Brazil, which imports 20,000 to 25,000 metric tons of salted cod each year.

One source said that the Japanese-Brazilian company was contemplating shipping frozen tuna loins to the United States and also that it was considering entering the lobster and shrimp fisheries for export to the United States.

The present sausage capacity is stated to be about 20,000 sausages a day. The fish, a mixture of both tuna and billfish, are defrosted, skinned, and cut into strips about two inches thick. These strips of meats are placed in the grinding machine and the pulp is weighed and transferred to the mixing machine where salt, condiments, a stabilizer, and coloring are added. When thoroughly mixed the product is placed in a sausage-extruding machine which forces the mixture into plastic casings which contain 125 grams. After weighing, the casings are stapled and trimmed and heated for 15 minutes in a water bath held at between 190 to 195° F. The product, which has much the flavor of a hot dog, is then ready for consumption. It must be kept under refrigeration.

The eight fishing vessels reported in use by the company vary in carrying capacity from 90 to 300 tons. All have long-line haulers and are equipped for freezing the catch. Several of the larger boats have radar. Both glass and plastic floats are used on the long lines. Frozen sardines (*Sardinella*) caught near Rio de Janeiro are reported to be the preferred bait. Trips are from 20 to 60 days. There are three general fishing grounds for yellowfin. All are well offshore beyond the continental shelf. The northern area extends from French Guiana to the mouth of the Amazon, the centralis from about Parnaiba to Fortaleza, and the southern area is about from Cabo São Roque to Recife.

Albacore (*Germo alalunga*), which are not fished by these vessels, are reported to occur in abundance offshore between about Cabo Frio (which lies about 60 miles east of Rio de Janeiro) and Santos.

It was reported that the company was planning on constructing more frozen-storage plants. The proposal was to increase the capacity of the Recife plant by an additional 250 to 500 tons and to erect a 250-ton plant in Natal and a 500-ton plant in Rio de Janeiro.

The Japanese-Brazilian company is also in the whaling business, having purchased the shore plant located near João Pessoa. This whaling station is one of two located in Brazil. The other is near Florianópolis in southern Brazil and is reported to be very small, with a catch of only about 10 whales in 1957. The whales are said to be harpooned from row boats. The whaling station near João

Pessoa is said to have two catcher vessels which take between 200 and 300 sperm and sei whales a year. The proposal of the new owners is to bring in four additional catcher vessels.

Another Japanese fishing company (controlled by another large Japanese fishing company) operates out of Santos, Brazil, and also sells all its products in Brazil, mostly in São Paulo. This company has four trawlers and two tuna long-liners. One of the officials said they were applying for four more trawlers to catch bottom fish and shrimp. They also have established 11 retail outlets in various parts of São Paulo. Freezing and storage space is rented in Santos, but not in São Paulo. The fish and shellfish, as required, are trucked to the markets in São Paulo. They have plans for constructing a 15-ton ice plant and a 500-ton storage plant in Santos. The Santos company now supplies about 20 percent of the 70 to 80 tons of seafood consumed daily in São Paulo.

None of the Santos boats have freezing equipment. They all carry ice. The long-liners catch yellowfin tuna off Recife and their trips are about 25 days each. Yellowfin retails in São Paulo for 28 to 30 cruzeiros a kilogram (about 9-10 U. S. cents a pound) while other fish are from 40-90 cruzeiros (about 13-30 U. S. cents a pound).

The trawlers generally fish to the South of Santos where they catch various bottom fishes and shrimp. An official of the company said that the boats had not encountered sufficient concentrations of shrimp to justify an exclusive operation for export. They can sell all they catch on the local market at good prices. Shrimp, with heads on, were retailing at 100 to 160 cruzeiros a kilogram, depending upon freshness (about 32-52 U. S. cents a pound).

The eleven retail outlets established by the Santos company are placed at strategic spots in São Paulo. Each consists of a small building containing refrigerating equipment and one or two enclosed display cabinets. They are reported to cost about 200,000 cruzeiros each (slightly over US\$1,400). Apparently the Santos company has been effective in its operations.



### Canada

#### BRITISH COLUMBIA 1958 HERRING CATCH SETS RECORD:

British Columbia's 1958 fall herring catch was of record proportions. By December 17, 1958, when the herring fleet tied up for the balance of the year, close to 150,000 tons had been taken, an all-time record. Herring catches from 1954-57 averaged about 52,000 tons.

The Fisheries Association of British Columbia attributed this record herring catch to good spawning and ocean conditions, as well as to wise management and conservation policies.

Most of the herring catch is taken in inlets on the West Coast of Vancouver Island and then sent to reduction plants, where it is converted into fish meal and oil, the United States Consul in Vancouver Island stated in a December 16, 1958, dispatch.

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## Canada (Contd.):

**BRITISH COLUMBIA SHUCKED OYSTER PACK LOWER IN 1958:**

The pack of shucked oysters in British Columbia for 1958 of 62,628 Imperial gallons (75,154 U. S. gallons) was lower by about 7 percent from the 1957 pack of 67,366 gallons.

Retail prices in Vancouver on January 15, 1959, were between C\$0.52-0.55 for a  $\frac{1}{2}$  pint container.

Pack of British Columbia Oyster Meats by Size of Container and Prices Paid to Producers, 1957-58			
Unit <sup>1</sup>	January-December		Prices to Producers, December 1958 C\$
	1958 (No. of Containers)	1957	
$\frac{1}{2}$ pints	313,109	374,273	0.30-0.60
Pints	21,199	11,315	0.57-0.75
Quarts	18,438	14,860	1.00-1.65
Gallons	32,343	34,556	3.25-7.00
Total	62,628	67,366	-

1/Imperial gallon = 1.2003 U. S. gallon.

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**BRITISH COLUMBIA SALMON PACK IN 1958 NEAR RECORD:**

The 1958 pack of canned salmon by British Columbia canneries totaled 1,908,056 cases (48-1 lb. cans), one of the largest packs in the history of the fishery. The sockeye salmon pack of 1,079,155 cases was only 1,000 cases less than the all-time record of 1,080,000

cases in 1905. The pack of pink salmon was much higher than anticipated for an off-cycle year, 455,518 cases as compared with 363,633 cases in the off-cycle year of 1956. The catch and pack of chum salmon was disappointing (229,292 cases) due to the light escapement during the 1954 cycle year, when 580,575 cases were packed.

Table 1 - Pack of British Columbia Salmon, 1953-1958

Species	1958	1957	1956	1955	1954	1953
..... (Standard Cases--48 1-Lb. Cans) .....						
Sockeye (red) . . .	1,079,155	228,452	320,096	244,821	680,718	510,147
Spring (king) . . .	10,475	10,481	11,671	17,853	14,080	13,049
Steelhead . . .	1,213	1,126	1,254	1,590	3,733	3,030
Blueback . . .	11,083	12,147	10,549	10,544	4,302	2,055
Coho (silver) . . .	121,320	180,911	207,366	175,179	123,778	108,109
Pink . . . . .	455,518	751,608	363,633	831,253	335,550	794,764
Chums (keta) . . .	229,292	239,539	203,710	124,860	580,575	394,113
Total. . . . .	1,908,056	1,424,264	1,118,279	1,406,100	1,742,736	1,825,267

Note: Also see *Commercial Fisheries Review*, February 1958 p. 59.

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**DATED FRESH FISH FILLETS BEING MARKETED:**

Something new in fish marketing has appeared in Halifax, N. S., Canada, where housewives can now get their fresh fish fillets dated for quality. Fish processing plants in that area are now packing chlorotetracycline-treated fillets which bear a seal indicating that the product has a shelf life of ten days.

This innovation in fish marketing results from studies conducted at the Research Board of Canada's Technological Station in Halifax which have shown that the shelf life of fish that are of good quality initially ranges from 12 to 21 days at 32° F. Thus producers have an authoritative guide in prescribing the quality life of their fish products.

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**EAST COAST SCALLOP FISHERY TRENDS, 1957:**

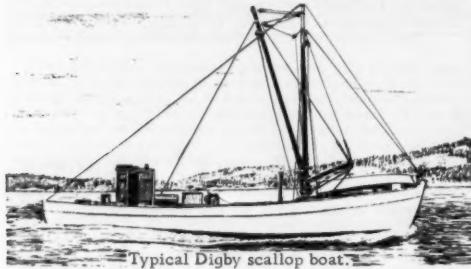
Canada's east coast landings of scallops (meats) were 3,410,000 pounds in 1957 as compared with 2,420,000 pounds in the preceding year. The average annual catch 1941-1951 was about 700,000 pounds.

The Bay of Fundy catch in 1957 was 1,340,000 pounds, the highest since the 1,850,000 pounds landed in 1937. The high catch was a result of good supplies of scallops on the grounds. The good fishery was forecast in 1952 on the basis of highly successful sets of young. These were the

## Canada (Contd.):

result of warm-water years in 1947, 1949, and 1951. Cooler years since then have probably produced fewer young scallops and it is likely that landings will soon drop to near the old average of half a million pounds annually.

Scallop fishing in the Gulf of St. Lawrence is erratic and depends upon the discovery of new beds as old ones are fished down or die out from natural causes. Since late 1956 the fishery in the southern Gulf is limited by regulation to



Typical Digby scallop boat.

vessels under 65 feet in length. The catch in 1957 was 230,000 pounds as compared with 430,000 pounds in 1956 when both large and small vessels made good landings from the well-stocked Toney River bed.

The spectacular increase in Canadian production resulted largely from the landings from Georges Bank by the offshore fleet. Landings were 1,690,000 pounds in 1957 as compared with 700,000 pounds in 1956. This increase far more than compensates for the decline in offshore landings from the St. Pierre Bank from 230,000 pounds to 150,000 pounds.

The great increase in scallop fishing on Georges Bank may so increase competition for the scallops that they may become harder to catch. In addition, there is some reason to think that the scallop population on Georges Bank may actually become less productive. Dr. Dickie notes that abundance on Georges Bank followed abundance in the Bay of Fundy and a decline in availability of scallops in the Bay of Fundy has already been forecast. ("Recent Trends in the Scallop Fishery of Eastern Canada," Progress Report No. 70.)

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#### PROSPECTS FOR NORTH ATLANTIC HADDOCK CATCH:

The east coast deep-sea fishermen of Canada can expect moderately good haddock fishing in 1959 and 1960 on the Grand Banks. The prediction, based on the good survival of the 1955 haddock brood, was made by the Director of the Fisheries Research Board of Canada Biological Station in St. John's Newfoundland, as the result of investigations in 1958 which confirmed findings from previous studies.

For many years scientists at the St. John's Station have been following closely the spawning and growth of haddock and other fish stocks on the fishing banks south and east of Newfoundland and have

predicted with remarkable precision the fishing results likely to be obtained in future years. During the past year, it was stated, the numerous 1949 year-class fish, which had dominated the commercial landings since 1954, appeared less significant in the catches. However, the moderate brood of 1952 and the smaller one of 1953 were fairly plentiful.

As opposed to this good news for the Grand Banks, the outlook for haddock fishing on St. Pierre Bank was bleak. The Station's investigations showed that in 1958, as in 1957, few haddock were available in that area. Moreover, there was no evidence of significant survival of young haddock on this bank since the very large spawning of 1949, of which no large quantities remain. The result has been that little commercial fishing has been carried on there since the winter of 1955/56.

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#### REFRIGERATED SEA WATER FOR FISH PRESERVATION ADAPTABLE TO SMALL FISHING VESSELS:

The use of refrigerated sea water for the preservation of fish can now be adapted to small fishing vessels. A Fisheries Research Bureau of Canada report describes installations in two steel vessels built in British Columbia during 1958. In their construction the engineering staff of the Board's technological station at Vancouver worked in collaboration with a naval architect and the shipbuilders to develop over-all plans and equipment layouts which give the vessels considerable versatility. As a result it was proved that refrigerated sea water can be applied to a vessel with little hindrance to its main function of catching fish.

Most important of the new and interesting features of one of these vessels was the installation of double-walled steel tanks for preserving fish in refrigerated sea water without reducing its normal holding capacity. This vessel is primarily a salmon troller, but it has also operated successfully as a seiner and as a fish packer. In addition, it can be used for crabs, which can be brought to port alive in the tanks. Furthermore, it can easily be employed for long-line halibut

## Canada (Contd.):

fishing or for use as a trawler. The report also stated that a refrigerated sea-water installation for a salmon cannery, completed in 1958, had given a successful practical demonstration of the suitability of this medium for refrigerating large quantities of salmon for short-term holding. The chilling of whale meat by this method is being investigated on the Pacific coast. The suitability of refrigerated sea water in Atlantic coast fisheries is being assessed on that coast also. (Fisheries Council of Canada Bulletin, January 19, 1959.)

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## TRANSPLANTED BRITISH OYSTERS GROW IN ATLANTIC WATERS:

Shellfish scientists of the Fisheries Research Board of Canada, at the Biological Station at St. Andrews, N. B., have satisfied themselves that European oysters transplanted from beds in North Wales in the United Kingdom will grow successfully in Canadian Atlantic waters.

The oyster project is designed to determine if this hardy species (*Ostrea edulis*) from across the Atlantic can be reared in the colder waters of the Maritimes, such as those along the eastern shore of Nova Scotia, where the native oyster (*Crosoystrea virginica*) cannot thrive because of low-water temperatures. Oyster beds in the three ocean-side provinces are restricted to the warmer waters of the Bay Chaleur, the Northumberland Strait, and the Bras d'Or Lakes.

If this and other experiments with the European oyster are successful, it would mean that this species could be established in areas where conditions preclude the raising of the native species. This possibility of developing a new oyster industry in the Maritimes is important in light of a recent epidemic which killed off about 99 percent of the oyster population in New Brunswick and Nova Scotia. Prince Edward Island--where oysters are resistant to the disease which devastated the beds in the sister provinces--is now the main Canadian producer of oysters.

In 1952 nearly 8 million pounds of oysters were fished in the Maritimes. In five years the epidemic had reduced that volume by more than half. Production in 1957 was less than 3.7 million pounds. Practically all the oysters marketed now in Canada come from Prince Edward Island beds.

The Department of Fisheries with the cooperation of its scientific arm, the Fisheries Research Board, is carrying out a three-year project to transplant 10,000 barrels of the island's disease-resistant oysters in the affected beds of New Brunswick and Nova Scotia. Already 6,000 barrels have been transferred, and the final phase of the project will be completed next spring. Even if these oysters establish themselves successfully, it will be 5 to 10 years before their progeny will have built up stocks sufficiently to warrant fishing. If we had had two species of oysters instead of one, we would probably have been much better off. It seems unlikely that the disease would have affected both.

In the initial report on the transplanting experiment, it was shown that researchers were encouraged to test overseas oysters because the State of Maine Department of Sea and Shore Fisheries has had some success in rearing them in the Boothbay Harbor area.

European oysters are somewhat different in appearance from Maritime oysters. They are nearly circular in outline instead of elongated, but they are not so deeply cupped and sometimes are referred to as "flat" oysters.

Unlike the native species, European oysters cannot be held for months in cold storage. It is best to use them within a few days after removal from the sea.

The current experiment was inaugurated last year when the Minister of Fisheries approved a trial introduction of 5,000 small European oysters. After making sure they were pest-free, they were placed in trays in Sam Orr Pond and Oak Bay in the St. Andrews area.

During the first months 95 percent of the stock died. Scientists believe the high mortality rate was due to the effects of their long air exposure during the 11-day ocean voyage from England.

However, the growth of the surviving five percent of the original stock was good. The diameter increased from 1.5 inches to 3 inches. It was also found that the oysters did not harbor pests or disease of any kind.

When the ice cleared from the ponds last spring, it was found that 99 percent survived the winter in Sam Orr Pond, but that all of the Oak Bay stock died. The mortality is blamed on a heavy freshet in January 1958 which reduced the salt content of the water to very low levels. While the number of survivors was small, the researcher said, "we can confidently say that North Wales oysters can be reared in our waters." He rightly points out, however, that this is not enough to give hope for a new industry. It must be found out if they will reproduce vigorously and if they are resistant to the Malpeque disease that affected so many of the Canadian native species.

Last April (1958) another lot of 5,000 oysters was shipped from North Wales to be used in breeding experiments and in experiments to test disease resistance. They were shipped by air to shorten their time out of water and to prevent heavy losses immediately after they survived the trip. They were planted in Sam Orr Pond for studies on reproduction. Mortalities were high, but not nearly as high as in 1957. (Trade News, November 1958, of the Canadian Department of Fisheries.)



## Chile

## FOREIGN FISHING VESSELS REQUIRED TO BUY PERMITS:

In December 1958 the Chilean Government released a statement reminding owners of foreign fishing vessels that permits must first be obtained from the Government to fish in Chilean waters. Permits, when issued, will be good for three years. No information on permit fees was made available in the statement.

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## NORTHERN AREA HAS GOOD PROSPECTS FOR FISHERIES DEVELOPMENT:

One of Chile's richest fishery zones is in the northern part, which abounds in anchovy, bonito, and tuna. However, in the ports of Arica and Iquique there are only 7 fish-processing firms, including a whaling station. Of these firms, three manufacture fish meal exclusively and the others divide their facilities between

**Chile (Contd.):**

canning and fish-meal manufacture. This northern fishery zone (off Tarapaca) is not only rich in marine life, but is also favored by a very advantageous customs and tariff situation. Arica is a free port and Iquique is a special duty-free industrial zone--all of which would benefit new fishing enterprises.

The Food and Agriculture Organization fishery mission to Chile, at the request of the Chilean Government, completed a survey of Chile's fisheries in 1957. The results of this survey provide some basis on which to establish means to develop the fishing industry. (*Boletin Informativo No. 59*, of the Ministry of Agriculture, Valparaiso, Chile, July 15, 1958.)

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**REGULATIONS ON USE OF  
ANTIBIOTICS IN ICE FOR  
REFRIGERATING FISH ISSUED:**

The Chilean Ministry of Health in Decree No. 1207 (*Diario Oficial* of December 9, 1958) approved a regulation dealing with the addition of antibiotics to ice used for refrigerating fish. Each antibiotic as well as the procedure of incorporating it in ice will be authorized by the National Health Service.

Distributors of antibiotics so used, ice-making plants, fishery plants, fish transport vehicles, and types and materials of containers used in marketing must be authorized by the same Service.

Containers of the fish product so treated must comply with the September 26, 1939, food regulations (Decree 770) and must have indicated the name of antibiotic, date of application to ice, and length of duration of activity, with the statement "treated with ice containing antibiotics to retard alteration."

The decree states infractions of the regulation will be sanctioned according to Sanitary Code.

**Costa Rica**

**AMENDMENTS TO MARITIME  
FISH AND GAME LAW:**

The Costa Rican Legislature in Law No. 2304, effective December 4, 1958, amended articles 7 and 16 of the basic Decree Law of September 28, 1948, which is known as the Maritime Fish and Game Law.

The principal change effected by Law No. 2304 in the basic Maritime Fish and Game Law is contained in the amended Article 7 which now requires that fishing for shrimp and fish with scales in national waters be carried on "only by vessels constructed within the country with national woods and labor." The amendment to the Maritime Fish and Game Law is the most recent of a series of new regulations pertaining to the country's fisheries resources.

These recent regulations all are protective in nature and reflect Costa Rica's growing concern over its fisheries resources. Last October, the Minister of Agriculture and Industries publicly assured local fishermen in Puntarenas that the Government had no intention of granting permits for shrimp fishing in Costa Rican waters, especially in the Puntarenas area, to foreign fishermen.

The present legislation also will serve to protect and promote the three very small local shipyards in the Puntarenas area. These three yards are capable of building small craft with a maximum size of from 80 to 150 gross tons. Even when operating at full capacity, these yards employ a total of less than 100 workers. While utilizing local labor and lumber, all three yards have to import the fittings and machinery which are installed in the vessels constructed. At present these yards are operating on a part-time basis.

The amended articles 7 and 16 follow:

"Article 7: In waters under the protection and control of the State the Maritime Fish and Game Law shall be pursued only by vessels or floating canneries under national registry and by vessels of foreign registry provided that they have a permit duly issued by the Ministry of Agriculture and Industries, assuming

## Costa Rica (Contd.):

compliance with the foregoing provisions, fishing for shrimp and fish with scales will be carried out only by vessels constructed in the country with national woods and labor.

"Article 16: Except as provided in Article 7 of the present law referring to fishing for shrimp and for fish with scales, fishing for export effected by means of vessels under foreign registry possessing the proper authorization of the Ministry of Agriculture and Industries, and whose product in a fresh condition is destined exclusively for foreign markets, will be subject to the provisions of the present law and its regulation as well as to the pertinent regulations which henceforth may be set forth.

"(a) Motherships and floating plants must always be situated in the bay and in sight of the national docks.

"(b) Fish caught within territorial limits which are not processed by plants established in the national territory will be considered as exports subject to customs duties and other surcharges in conformity with the respective tariff; and

"(c) Motherships, ship plants, and other vessels will pay the transshipment duty on merchandise which is transshipped to other vessels. They must also obtain the municipal license tax corresponding to the jurisdiction in which they may be located and pay the required import duties if they transfer to the shore any type of merchandise coming from themselves."

The provisions of Articles 7 and 16 will not apply to foreign vessels engaged in the fishing for shrimp and for fish with scales if they have been registered in Costa Rica before the date of publication of the present law. Such vessels may continue operating in national waters.



## Cuba

DEVELOPMENT OF BONITO FISHERY:

Cuba's bonito fishery began in 1932 as an experiment. A group of about 20 Japanese fishermen who were engaged in long-line fishing south of Cuba (between Cienfuegos and Batabano) encouraged a Cuban firm to build a vessel especially for bonito fishing and gave instructions on fishing bonito by Japanese methods.

The first vessel built for bonito fishing in Cuba had a cold-storage capacity of about 8,000 pounds and a crew of 8--mostly Japanese fishermen. Until 1942, there was almost no progress made and no other vessels were built for bonito fishing. In 1942, two vessels were constructed in Batabano, both somewhat larger and better equipped than the first vessel. In the following years, more vessels were built and the bonito fishery increased. Now, Cuba has 45 vessels especially equipped for bonito fishing and their combined crews total 450 men.

The method of bonito fishing used in Cuba is the same as used by United States tuna fishermen--live bait and pole-and-line. Cuban fishermen receive between 10-12 U. S. cents a pound for fresh bonito delivered to the canneries. The fishermen fish under seasonal contracts and are given a guarantee on their total catch.

Larger vessels are presently being built with refrigeration facilities adequate for fishing in more distant waters. The vessels that are now being used have cold-storage capacities of 8,000-15,000 pounds. The new vessels will have a capacity of 40,000 pounds.

It is estimated that final tabulations of Cuba's 1958 bonito catch will amount to about 6 million pounds, indicating that this fishery has progressed considerably since its start. (*Industria Conservera, Vigo, Spain, September 1958.*)



## Denmark

FISHERY PRODUCTS EXPORTS UP IN 1958:

Exports of fishery products by Denmark increased sharply from 308 million kroner (US\$44.6 million) in 1957

## Denmark (Contd.):

to about 360 million kroner (US\$52.5 million) in 1958, according to estimates based on the first 11 months of 1958. Substantially higher exports were made in 1958 to all of Denmark's customers except the United Kingdom and Brazil. Exports to the United States during the first 11 months of 1958 of 35.6 million kroner (US\$5.2 million) were the highest on record. In 1957 they amounted to 18.4 million kroner (US\$2.7 million).

Product	Principal Danish Fishery Products Exports to United States, 1957-58				Percentage Increase	
	January-November					
	1958	1957	Million Kroner	US\$ 1,000		
Fish solubles	5.7	825	1.3	188	338	
Salt herring	1.3	188	0.3	43	337	
Fish and fish fillets	15.0	2,172	5.6	811	168	
Northern lobster	4.5	652	2.6	376	73	
Rainbow or brook trout	8.5	1,231	7.7	1,115	10	

Denmark's exports of fish and fish fillets were primarily cod and flounder fillets. The cooperative fish meal factory at Esbjerg was able to distribute its regular Christmas bonus in 1958, mainly because it had found a good market in the United States for its byproducts.

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FISH INSPECTION SERVICE:

A law designed to maintain and foster the quality of Danish fishery products was passed in 1950. Known as the Quality Law, it was later revised in 1954. This law pertains to all aspects of trade in fishery products as well as methods of catching, storing, transporting, freezing, preserving, and the handling of fish and fish products. Fish for export and domestic use as well as imported fish come under the jurisdiction of the law.

Poor quality fish are defined as those products which because of pathological spoilage, contamination, faulty preparation, or any other reason, must be considered unfit for human consumption. The consumer is further protected by the next clause of the law which states that products must not be sold which, although fit for human consumption, are not absolutely fresh. Furthermore, if the products are to be transported and cannot be guaranteed to reach their destination in good condition, they will not be passed by the inspector.

Fish which are found to be unfit for human consumption are destroyed or used for fish and animal fodder. Fish of good quality but which are judged to be unable to reach their destination in satisfactory condition are withheld from export but may be used for domestic sale.

Denmark, which has an area of only 17,000 square miles, is divided into 39 fisheries inspection districts. The decentralized control body which is known as the Fisheries Inspection Service places at least one fish inspector in each district. The division of the inspection district and the number of inspectors in each is in accordance with the position and the importance of the fishing ports. At the present time there are 112 people in the Fisheries Inspection Service and the 39 fisheries inspection districts are supervised by three superintendents.

The fish inspector is present when the fish is landed, when it reaches the processing plants, the freezing houses, and until it is ready for the wholesale and export trade.

He is also called upon to inspect the processing plants, the sanitation control, quality of the raw materials, production in general, quality of the products, and the labeling or marking of the products.

However, the supervision of the inspection of fish-processing plants is the responsibility of the Danish Inspection Service for Fish Products. The more highly technically-skilled personnel of the centralized body who comprise this Inspection Service tour the different plants to check that they are meeting the requirements of the Ministry of Fisheries. On these occasions they meet with the local fish inspectors and discuss new regulations which affect both bodies. This service also takes care of the more technical and scientific problems and are consultative to the Ministry of Fisheries in questions regarding fish-processing plants and quality control.

Furthermore, a Quality Committee has been established to assist the Minister of Fisheries in all matters pertaining to the quality control of fish and fish products. The committee consists of five trade representatives, one representative of the health authorities, and one representative of the Ministry of Fisheries.

The quality law contains rules which must be adhered to virtually as soon as the fish is caught right up until the moment the housewife is serving it to her family. In general these provisions state that clean and sanitary conditions must be maintained wherever fish and fish products are stored or handled. For example, aboard fishing vessels, the fish must be stored in such a way that the bottom ones are not destroyed by those on top.

Another important provision of the law states that fish which are not caught alive must be iced and cleaned immediately. If the fish is caught alive, it must be kept in water of good quality until it reaches the consumer. When transporting fish, steps must be taken to provide proper protection against wind and weather.

Those merchants involved in the wholesaling or exporting of fresh or frozen fish must first obtain a permit from the Ministry of Fisheries. A similar provision is in force for the retail trade.

Quality assessment of fish is usually made by organoleptic (judging the quality of fish by texture, appearance, odor, and taste) testing, although several objective methods have been suggested and are used to some degree.

The quality laws also provide the Ministry of Fisheries with the power to determine what establishments shall engage in the manufacturing, freezing, or processing of fish and fish products. Authorization is granted to those establishments which meet the requirements of the Ministry of Fisheries, the Public Health Authorities, and the Directorate of Labour Inspection. (*Trade News*, November 1958.)

**German Democratic Republic****FISHING FLEET EXPANSION INCLUDES PLANS FOR 20 LARGE STERN TRAWLERS:**

In order to achieve the goal of meeting the demand for fish and to conserve foreign exchange, the East German fishing industry plans to build 20 large (1,400 metric ton capacity) stern trawlers by 1975. Ten of these stern-trawlers are scheduled to be ready by 1965.

**German Democratic Republic (Contd.):**

In the fishery combines, processing plants, and shipyards on the Baltic Coast intensive work is going on. In addition to the vessel building program, new technical plants are being erected and new fishing grounds and methods are being explored.

The deep-sea fishing fleet is developing fast. In 1950 the East German fishing fleet consisted only of 9 luggers and 58 cutters. In 1958 the fishery combines of Rostock and Sassnitz and coastal fisheries operated a fleet of 20 trawlers, 34 luggers, 20 steel-hull cutters (86.9 feet in length), 200 cutters (78.7, 55.8, and 39.4 feet in length), and 100 cutters (32.8-55.8 feet in length). About 89,000 metric tons of fish were landed in 1958. Plans call for increasing this total many times. In 1959, the 100,000-ton level is expected to be surpassed for the first time.

New methods are planned to catch larger quantities of herring from the North Sea, halibut from the fishing grounds between Iceland and Greenland, ocean perch on the "Rosengarten," and mackerel on the "Vikingbank," off the Shetland Islands.

There are still many obstacles to be overcome to achieve the planned goals. The trips, which trawlers and luggers must make to reach the catching grounds, are often very long and, especially in the case of luggers, render fishing operations unprofitable, because of the unbalanced ratio of travel and catching time. Also, the quality of the landed fish has been poor on account of the long return trips.

In order to correct the deficiency in payloads, it is planned to place into service by 1960 five trawlers of Type III, which carry refrigeration and fish-meal plants. Compared with Trawler Type II, this type has larger measurements and larger carrying capacity. The fishholds can carry 452 tons of fish compared with 250 tons in Type II trawlers. The vessels which will be built will have a length of 215.0 feet, a width of 33.9 feet and a draft of 17.1 feet. They will have

a crew of 36, develop a speed of 13.5 knots an hour, and be equipped with a "father-and-son" power plant.

The main emphasis of the development program of the fishery fleet is placed on the factory trawlers, which were designed by a Wismar shipyard, and will also be built by that yard. In the future, factory-type vessels will be used predominantly in East German deep-sea fishing operations. The construction of the prototype of a factory trawler was completed in 1958. A total of 10 factory trawlers will be turned over to the fishery combine in Rostock by 1965. Preliminary planning provides for a fleet of 20 vessels of this type to be built and operated by 1975. The last 11 vessels to be built under this program will have Diesel-electric propulsion. It is planned to operate the factory trawlers in Arctic waters, off the coasts of Greenland and Iceland. They will be able to stay at sea for 60 days, of which about 40 days will be spent actually in catching fish. Their operating range of 5,280 nautical miles is about equal to 20 days' travel time.

An 8-cylinder four-stroke engine with a power output of 1,900 horsepower will drive the propeller at 220 revolutions per minute, permitting a full speed of 12 knots. During fishing operations the speed will be 4.5 knots, with a pull on the cod ends of 9 tons. Measurements of the factory trawler will be as follows: over-all length, 284.5 feet; molded breadth, 44.3 feet; molded depth up to the wheelhouse top, 47.9 feet; molded depth up to the main deck, 23.0 feet; designed draft, 16.4 feet; and carrying capacity, 1,421 metric tons.

The fish caught by the stern-type trawlers will be dumped through two hatches into the processing room located in the after part of the ship. There the following fish-processing machinery will be installed: one filleting machine for ocean-perch, one filleting machine for round fish; one machine for processing small round fish; and a skinning machine. The fillets will be placed on trays, conveyed to a freezing tunnel, where they will be frozen at a temperature of -18° C. (0° F.). Thereafter the final processing and packing takes place. Subsequently,

### German Democratic Republic (Contd.):

a 72-foot chain conveyor belt takes the fillet packages, of 55 pounds each, to the lifts forwarding them to the deep-freeze storage rooms. The storage rooms are designed to hold about 800 tons (580 tons of fillets, 200 tons of fish-meal cake, and 60 tons of fish oil).

In order to fully utilize the processing capacity, about 1,500 tons of ocean perch or 1,250 tons of round fish will have to be caught per trip. Annual landings per ship are set at 5,100 tons. Later, when sufficient experience has been gained, annual landings shall amount to 5,800 tons. (For comparison: a lugger catches an average of 531.3 tons and a conventional trawler 1,539.7 tons of fresh fish a year.)

The ship, which is equipped with foremast and main-mast, will have a crew of 98, of whom 19 are nautical personnel, 15 engineers, 55 operators of fish-processing machines, and 7 stewards. In addition, a physician and a male nurse will be stationed aboard ship.

Single cabins will be available for the ship's officers, the crew will be accommodated in modern and practically furnished two- and four-bed cabins. Apart from the usual ship installations, there will be a laundry with drying and ironing facilities, a bakery, a medical station for the physician, and a hospital with six beds, several washrooms, shower-baths, bathrooms, and a club room. Movies may be shown in the crew mess.

The hull of the factory-type vessel, subdivided by 7 waterproof bulkheads, will be built according to a system of transverse framing and, with few exceptions, will be fully welded. For the first time, an electric power plant will be installed, producing three-phase current. It is planned to install two additional electric winches of 1.5 tons capacity each in order to be able to discharge the ship within 16 hours.

The factory trawlers offer every possibility of improving fishing operations. Together with trawlers, luggers, and cutters of the deep-sea fishing fleet, these

ships will serve to meet the fish demand of the population of the German Democratic Republic by their own landings in the foreseeable future. (Translation from the East German periodical *Die Schiffahrt*, October 1958 and transmitted by the United States Consul in Bremen).

### Ghana

#### PLANS FOR DEVELOPMENT OF FISHERIES:

Projects adopted for meeting fisheries production problems were outlined by the Ghana Minister of Agriculture in a speech given at the opening of an agricultural show.

The fishing industry will be aided by the construction of a large fishing port at Tema and a smaller port at Elmina for small trawlers and other powered craft. Plans call for the completion of the small port of Elmina by about July 1, 1959, and the completion of the larger harbor at Tema by about January 1, 1960.

It is also proposed to establish properly organized marketing facilities at the fishing ports. The markets will be managed by the Agricultural Development Corporation under the guidance of an expert attached to the Ministry of Agriculture, the United States Embassy at Accra reported on January 8, 1959.

### Guatemala

#### UNITED STATES FIRM PLANS TO FISH FOR SHRIMP IN GUATEMALAN WATERS:

All the legal requirements have been fulfilled to grant permission to a San Francisco, Calif., fishing company to operate in Guatemala's Pacific maritime zone. The San Francisco Guatemalan consul cabled Guatemala January 3, 1959, saying: "Twenty boats will arrive before January 31 to sound and identify shrimp banks and to assign large fleet for permanent operations there under Guatemalan flag. A week before, representatives will arrive to arrange taxes, licenses. I am

## Guatemala (Contd.):

writing giving details, Consul, Guatemala," according to a January 5 press release from the Information Secretariat of the Presidency.

The Guatemalan press release continues "...our ambassador in Mexico has informed about applications of various Mexican fishing companies which wish to work on our Pacific coast ...." This information has not been checked out in the United States.



## Hong Kong

## SHRIMP FISHING INDUSTRY:

**Foreign Trade:** The processing of shellfish (about 75 percent shrimp) has expanded rapidly in the British Crown Colony of Hong Kong since 1955. In the first nine months of 1958, exports of fresh, chilled, and frozen shellfish (table 1) totaled about 4.2 million pounds (value

of Commerce and Industry place the annual average catch at about 10 million pounds (heads on).

In addition to the exports of fresh, chilled, and frozen shrimp, Hong Kong exports fair quantities of salted, dried, and pickled shellfish. During the first nine months of 1958, Hong Kong exported 68,000 pounds of cured shellfish (90 percent shrimp) to the United States or about 10 percent of total exports of 668,000 pounds to all countries.

Another source of statistical data on Hong Kong's foreign trade are figures on value compiled from the Comprehensive Certificates of Origin. Data derived from this source show that exports of frozen shrimp for January-October 1958 amounted to US\$2.6 million (c.i.f.). During the same period exports of sliced shrimp noodles amounted to US\$55,000 and shrimp paste US\$35,000.

**Fishing Seasons and Grounds:** There are two main fishing seasons for the Hong Kong shrimp fishing fleet. During

Table 1 - Hong Kong's Exports of Fresh, Chilled, or Frozen Shellfish, 1955-1957 and Jan.-Sept. 1958

Country	Jan.-Sept. 1958		1957		1956		1955	
	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$	1,000 Lbs.	US\$
United States . . .	3,343	2,241	1,300	790	578	317	67	33
Canada . . . . .	425	180	971	396	758	117	159	47
All others . . . . .	436	202	258	109	320	79	169	51
Total . . . . .	4,204	2,623	2,529	1,295	1,656	513	395	131

Note: Value is f.o.b. Hong Kong.

US\$2.6 million) as compared with about 2.5 million pounds (valued at US\$1.3 million) for the entire year of 1957. Only 0.4 million pounds were exported in 1955. It is estimated that more than 75 percent of the shellfish exports consist of frozen shrimp (heads off).

The United States is Hong Kong's principal customer for shellfish (about 90 percent frozen shrimp). For the first nine months of 1958, exports of shellfish to the United States accounted for 79.5 percent of the total quantity and 85.4 percent of the total value.

No statistics are collected in Hong Kong on the landings of shrimp, but estimates from officials of the Department

the early season from April through the end of the typhoon season in September, the shrimp trawlers operate in the waters around the Colony. The primary area for shrimp at this season lies south and east of the Lema chain of islands, held by the Chinese Communists. Here the sea bottom falls off very gradually, beginning at about 20 fathoms. A secondary shrimp area is in the Urmston Roads off Castle Peak, within Colony waters. During the rest of the year, from October-March, shrimp trawlers must proceed northeast from Hong Kong, along the China mainland coast. Some trawlers are away for a month at a time during this season, going as far as 600 miles up the coast to grounds off Fukien Province.

## Hong Kong (Contd.):

Fishing Fleet: for the most part, Hong Kong's shrimp trawlers are sail-powered. The 1955-57 reports of the Director of Agriculture, Fisheries, and Forestry states that only 280 out of the 769 shrimp trawlers based in the Colony are motorized. Both types of trawlers use beam trawls with about a 10-foot spread, dragging either 7 or 9 such trawls from booms on either side of the boat and from the mast. There have been no significant changes in the total strength of the shrimp-catching fleet from 1956-1958, although a large number have been mechanized in this period.

shrimp, less than 30 to the pound; medium shrimp, 31 to 60 to the pound; and shrimp more than 61 to the pound. Large shrimp account for about 10 percent of the total catch, medium shrimp about 65 percent, and the remaining 25 percent small sizes.

Government Assistance: Some government assistance is afforded owners of shrimp vessels in the form of low-interest loans. These loans are made only for the purchase and repair of craft and gear. They are made to the individual vessels either through cooperatives or direct by the Department of Cooperatives and Marketing or the Department of Agriculture.

Table 2 - Hong Kong's Export of Salted, Dried, or Pickled Shellfish,  
1955-1957 and Jan.-Sept. 1958

Country	Jan.-Sept. 1958		1957		1956		1955	
	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000	1,000 Lbs.	US\$ 1,000
United States . . . . .	68	63	83	103	96	124	87	166
Malaya . . . . .	285	124	168	89	466	144	376	151
Philippines . . . . .	1	1/	1	1/	5	1	301	85
Taiwan . . . . .	10	2	901	89	583	51	239	19
All Others . . . . .	304	136	265	148	459	174	158	68
Total . . . . .	668	325	1,418	429	1,609	494	1,161	489

Note: Values f.o.b. Hong Kong.

1/ Less than US\$500.

Species Landed: The principal species of shrimp landed at Hong Kong is Metapenaeus monoceros. Varieties of lesser importance are Penaeus monodon, Penaeus japonicus, and Penaeus orientalis. The latter species flourishes in waters colder than those surrounding the Colony and are landed by the trawlers that fish off the China coast in the winter months. Most of the Penaeus orientalis that is marketed in Hong Kong, however, is imported from Communist China.

Facilities and Processing: Shrimp are not canned in Hong Kong. There are 12 cold-storage plants which have freezing facilities for packing of shrimp for export. The bulk of this business is handled by the five plants which are approved by Government agencies under the Comprehensive Certificate of Origin procedure. Fair quantities of shrimp are sun-dried and used for food, while substantial quantities of shrimp paste are also made in the Colony.

In the Hong Kong market, shrimp (headless) are graded in size as follows: large

No financial assistance in any form is given to commercial processors or exporters by the government. There is no foreign participation in the Hong Kong shrimp fishery or processing industry.

Table 3 - Value<sup>1</sup> of Shrimp and Shrimp Products Certified Under "Comprehensive Certificate of Origin" for Export from Hong Kong to United States, Jan.-Oct. 1958

Months	Frozen Shrimp	Sliced Shrimp Noodles	Shrimp Paste
January . . . . .	211	5	1
February . . . . .	185	2	3
March . . . . .	293	5	2
April . . . . .	320	6	3
May . . . . .	445	8	2
June . . . . .	231	5	2
July . . . . .	255	4	2
August . . . . .	173	7	2
September . . . . .	211	4	15
October . . . . .	280	9	3
10 Mos. Total . . .	2,604	55	35
1/c.i.f. value.			

Territorial Waters: The Chinese Communist regime has announced that its territorial jurisdiction extends to the 12-mile limit. While the British government does not recognize the legality of this unilateral extension, the Communists have successfully excluded the

**Hong Kong (Contd.):**

Hong Kong fishing fleet from its waters. This has been done by imposing fines on Hong Kong-registered vessels found fishing within the 12-mile limit and in some cases by confiscation of the vessels. These restrictions severely hamper the growth and stability of the local fishing

industry. Particularly is this true of Hong Kong-based shrimp fishing vessels which will have difficulty finding alternate fishing grounds to those in which they have traditionally fished. In view of these disturbing developments, the local shrimp fishing industry is likely to suffer rather than expand.

**Iceland****FISHERIES TRENDS, DECEMBER 1958:**

The Iceland autumn herring season is usually finished by mid-December, but in December 1958 the boats were making record catches. The herring, which disappeared in October, returned in quantity to the Southwest Coast. Over 100,000 barrels of autumn herring have been salted, permitting fulfillment of all advance sale contracts and assuring some reduction in the clearing deficits with the Eastern European countries, Iceland's chief customers for herring.

The Union of Icelandic Fishing Vessel Owners has held its annual meeting; made its annual complaints over the inadequacy of prices and export supports; and issued its annual threat to stay in port, instead of commencing the main winter cod season in January 1959, unless fish prices are raised. A committee of Government economists has been meeting to prepare for the annual negotiation, normally conducted by the Minister of Fisheries, which has been delayed this month by reason of the Government crisis. The vessel owners themselves have calculated that a typical 60-ton boat with a catch equivalent to the average in Faxa Bay during the last 5 years and paying wages based on the wage index of 185 (which prevailed from August to December 1, 1958) would show a deficit of about US\$5,000, at current fish prices. With the 9.2-percent escalation wage increase of December 1, 1958, the deficit would be larger.

Iceland joined with others of the 11 members of the Organization for European Economic Cooperation (OECC) outside the Common Market in protesting to the Common Market Nations over the prospect of discrimination at the

first stage of the Common Market which came into effect on January 1, 1959. The Icelandic note, addressed to the Federal German Republic, followed the model used by most of the other members of the Free Trade Area.

Just prior to the dissolution of the Cabinet the Minister of Industries reported to the Althing on the progress of negotiations, stressing their importance in view of the fact that almost half of Iceland's exports now go to OEEC member countries. A Leading Conservative, director of the National Bank and former representative of Iceland to the OEEC, has publicly supported the Government's position in all respects except for its insistence on preserving Iceland's bilateral clearing agreements. The high prices paid by the Eastern European countries for Icelandic fish are illusory, he stated, because of the corresponding high prices and the poor quality of the imports from Eastern Europe.

Although the trawlers had adequate Icelandic labor during the autumn fishing for ocean perch off Newfoundland, they faced an acute shortage during the cod season which commenced in January 1959. During the main winter season, the trawlers must compete for labor with the entire motor boat fleet and they usually cannot offer as good terms as the motor boats. The Trawler Owners Association sent representatives to the Faroe Islands in an effort to recruit seamen (some 900 Faroese seamen were employed in winter of 1958 and more than 1,300 the year before). But the Faroese have demanded exemption, or partial exemption, from the 55-percent exchange surcharge imposed by the Export Fund Law of May 1958, and this is a concession which the trawler owners are powerless to grant.

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**FISHERIES TRENDS, JANUARY 1959:**

Early returns from the winter motor trawl-line fishery off the southwest coast of Iceland indicate exceptionally good catches, particularly for haddock.

During January, two Icelandic trawlers landed trips in England. These were the

first landings of Icelandic fish since the start of the fisheries limit dispute. Three more Iceland vessels were reported to be en route to England with trips of fish. The British Union of Masters and Mates has threatened to strike unless landings by Icelandic vessels are banned.

**India****DEVELOPMENT OF MARINE FISHERIES CONFERENCE:**

A two-day conference of Ministers and officials connected with fishery development in the maritime states of India was held in Bombay on

November 8-9, 1958. Presided over by the Deputy Minister of Agriculture, the conference was attended by about 75 officials representing the states of Bombay, Mysore, Kerala, Madras, Andhra, Orissa,

## India (Contd.):

and West Bengal. The conference was called with the object of exchanging notes among the officials of the different states and to discuss matters connected with the development of fisheries during the Second Five Year Plan period.

The conference was indicative of official interest in fishery development which has assumed greater importance in view of the tight food grain situation.

Under the Second Five Year Plan, an allotment of Rs.117,758,000 (US\$24.7 million) has been made for the development of fisheries. The development programs envisaged in the Plan include the expansion of current activities relating to mechanization of fishing boats, provision of increased harbor facilities, introduction of improved curing and marketing methods, and technological research. These programs may have to be curtailed due to rephasing of the Plan.

Inaugurating the conference, the Deputy Minister emphasized the urgent necessity of enlarging the fish supply in the country in view of the "alarming increase pressure on land" caused by the rapidly growing population. Even at present, he said, the availability of fish was very low. Against an estimated annual requirement of 4,050,000 long tons of fish on the basis of minimum nutritional standards, current production is only of the order of 1,100,000 tons.

An important factor which had been hampering rapid development of the fishing industry, according to the Minister, was the continued low socio-economic condition of fishermen. Until very recently, private capital had not been attracted to the fishing industry. Recognizing that increased fish output was closely linked with the improvement in the fishermen's economic status, official efforts had been directed, from the very beginning, toward this end by means of setting up fishermen cooperatives. Nevertheless, he admitted that the actual achievement in organizing cooperatives had not been appreciable. He advocated, therefore, that more attention should be devoted to this aspect of the problem by stimulating the establishment of a large number of cooperative fishing and marketing societies. In this connection, he suggested that one of the purposes of the conference should be to devise ways and means of achieving this objective.

Referring to the introduction of mechanized fishing boats in recent years as a means of enlarging fish catch in offshore waters, the Deputy Minister expressed gratification at the considerable progress made in Bombay State in this direction. He said that he was aware that the demand for marine engines and modern fishing gear from fishermen in Bombay and other states was growing, but pointed out that foreign exchange posed a serious problem even to meet a part of the requirements.

In view of the Government's interest in expanding fishery resources, the Deputy Minister indicated that private and cooperative enterprises desirous of undertaking deep-sea fishing operations in col-

laboration with foreign interests and technical "know-how" would be assisted with long-term credits. In his view, the foreign collaborators should contribute technicians and capital equipment for fishing, storage, and processing on reasonable terms. In this connection, he drew attention to the successful operations of a commercial fishing company in Bombay which had aroused interest among local industrialists. He also disclosed that the Government had under consideration proposal to establish deep-sea fishing stations in Cochin (Kerala), Tuticorin (Madras), and Vishakapatnam (Andhra) on the lines of the exploratory station operating in Bombay since 1948.

On the question of marketing, the Deputy Minister observed that facilities for quick transport of fish from landing sites to consumer markets needed to be augmented. Regarding exports, he noted that large quantities of dried fish were being shipped out of India. A small export trade has also been built in frozen shrimp and spiny lobsters, chiefly with the United States. He also pointed out that freezing of fish required to be developed on a large scale if exports were to be expanded and said that the Government would offer appropriate assistance to encourage the processing of fish and fish products for export.

The conference resolved itself into four subcommittees to facilitate detailed consideration of the various aspects of fishery development. These included training, research, exports, quality standards, transport, marketing, organization of cooperatives, and utilization of facilities available in the community development projects. The conference reconvened on November 9 to discuss the reports of the subcommittees.

The conference adopted a set of 37 recommendations covering practically all aspects of marine fishing, marketing, and transport. The conference proposed that the Central and State Government's encourage the formation of private fishing companies for catching, processing, and distribution of fish, both for domestic consumption and exports. The need for observing high-quality standards for export purposes was emphasized, and it was recommended that only high-quality products should be exported. It was also recommended that harbor and docking facilities for fishing vessels be improved. With respect to mechanization of fishing craft and gear, the conference recommended that priority be given to the import of engines and other ancillary equipment. It was further recommended that local firms be given appropriate assistance in the manufacture of engines and other fishing gear.

The conference also proposed that credit facilities be extended to cooperatives engaged in the production, marketing, and transport of fish on the same lines as agricultural cooperatives. Other suggestions included the provision of insulated and refrigerated railroad cars and trucks for fish transport, establishment of separate fish markets in urban areas, construction of cold storages, and the inclusion of fishermen villages in community development blocks.

### India (Contd.):

Unconfirmed press reports stated that the conference also called upon the Government to make a public pronouncement outlining its policy toward foreign investment in fishery products.



### Iran

#### PROPOSES 12-MILE TERRITORIAL SEA OFF COAST:

A bill amending the 1934 Six-Mile Law was introduced in the Iranian Senate on December 20, 1958, to establish a 12-mile territorial sea off the Iranian coast and around all islands under Iranian sovereignty. The bill was cleared for urgent action (without second committee consideration and for floor debate within one week) despite objection on principal by the Chief Iranian Delegate to the 1958 Law of the Sea Conference. He stated that Iran should not rush into possible contradictions of Protocols previously signed and reminded the Senate that the question would probably be settled by the second Law of the Sea Conference to be held in 1960, the United States Embassy in Tehran reported on December 20, 1958.



### Ireland

#### FIVE-YEAR PLAN PROVIDES US\$8.4 MILLION FOR FISHERIES DEVELOPMENT:

A total of £3 million (US\$8.4 million) for the development of fisheries, including harbors, is included in the Irish Republic Government's Five-Year Economic Expansion program. Expenditure on fisheries is fixed at the rate of £400,000 (US\$1.1 million) in the first year increasing to £500,000 (US\$1.4 million), £500,000 (US\$1.4 million), £550,000 (US\$1.5 million), and £600,000 (US\$1.6 million) in the succeeding years. In addition £500,000 is likely to be spent on harbor development in the five-year development.

The White Paper giving the program says "Hitherto, sea fisheries policy has

been aimed at supplying the home market with fresh fish from landings by inshore fishermen. The market is restricted; our consumption of fish is one of the lowest in the world. The home market could be expanded considerably if prices were reduced by an increase in supplies, and if the means of distribution were improved.

"Our exports are small, but it is clear that markets are available if we can supply high-quality fish at a competitive price. With good prospects of markets at home and abroad, policy is now aimed at a substantial increase in landings of fish.

"A Food and Agriculture Organization consultant is being engaged to review the industry to suggest the lines upon which it should be developed as an export industry, to advise on measures to increase catching power and processing, to facilitate marketing and to attract the necessary capital. . . . An Icelandic master fisherman has been engaged to advise fishermen in modern methods and techniques. Two groups of young fishermen are undergoing training as skippers--the first ashore at Galway and the second at sea. It is hoped the course started at Galway will develop into an established nautical school." (The Fishing News, November 20, 1958.)



### Israel

#### TRAWLERS TO FISH OFF CANARY ISLANDS:

Israel is to have two trawlers for deep-sea fishing off the Canary Islands. Each trawler will carry an all-Israel crew of 30 and will be capable of processing 1,750 metric tons of frozen fish, 250 tons of salt fish, and 175 tons of fish meal annually. These trawlers will carry Canary Islanders as pilots to guide them to the grounds. The extension of Israel's fishing activities into the Atlantic is the result of the geo-political situation which hampers the further development of offshore fishing in the Mediterranean. (December 1958 World Fishing, fishery periodical.)



## Japan

### FISHING INDUSTRY RECOMMENDATIONS FOR CONFERENCE WITH RUSSIA:

The Japanese fishing industry has considered since early November 1958 the position it would like Japan to take in the annual fisheries conference with the Russians, which opened in Tokyo on January 12, 1959. The industry recommendations were completed at a meeting of a special committee on December 19, and were presented to the Chief of the Japanese Fishery Agency's Production Division on December 20, 1958.

The recommendations aim toward a general relaxation of controls on the Japanese high-seas salmon and crab fisheries, and the setting of a salmon catch quota (the main point at issue in the annual meetings) 50-percent higher than for 1958. Among the reasons cited by the industry for its very optimistic demands are the facts that next year is the peak in the two-year cycle of pink salmon abundance, the claim of Japanese that high-seas fishing does not put a heavy strain on salmon stocks (because many of the fish taken offshore would be lost to natural mortality before reaching the spawning streams), and a belief on the part of the Japanese that poor Soviet salmon catches in the past season are due, at least in part, to the ineptness of Russian fishermen. A dark background to these optimistic claims, however, is provided by the apparently undeniable fact that the Soviet catch was very meager in 1958, perhaps only about half of the Japanese catch, and also by reports of Japanese fisheries observers who visited the Soviet Far East in August and saw how few spawners were ascending some of the major rivers.

Specifically, the Japanese industry asks its Commissioners to bargain for a 165,000-metric-ton salmon catch quota as compared with the 110,000 tons which the Japanese settled for in 1958 (when the industry asked for 165,000 tons and the Commissioners opened negotiations with 145,000 tons). During the past season, Japanese fleets limited their catch of red salmon, but because of the nonselective fishing method used, such quotas for particular species are held to be impracticable and the industry wants none of them next season. Since the over-all catch is subject to a quota, the industry considers a time limit on the fishing season unnecessary and wants it dropped or at least an extension made beyond the August 10 closing date enforced in 1958. The quantity of net set and the spacing of the arrays of nets, the industry feels, should be governed by natural conditions on the fishing grounds, and it wants the present regulations on these points dropped. Closed areas extending as much as 40 miles from shore, as they did in 1958, should be abolished, and any special conservation areas that are established should extend only to a radius of 20 miles from the river mouths. Furthermore, it is held that the permanent closing of the Sea of Okhotsk, agreed to by the Japanese last year, is unreasonable and should be reconsidered. The industry statement makes several recommendations concerning the need for improving conditions in the spawning streams, protecting the fry, and studying the depredations of seals and other predators. Finally, stress is placed on the importance of the fishery in Japan's economy with the claim that it provides a livelihood for almost 600,000 persons and brings in ¥20 billion (US\$55.6 million) in foreign exchange.

For the king crab part of the negotiations, the industry is asking that the quota of four fleets producing 320,000 cases, as during the 1958 season, be considered the absolute minimum. In addition, it is requesting the abolition of present closed areas, as well as the dropping of restrictions on size and spacing of nets, and the allowable percentages of female and immature crabs in the catches. (United States Embassy in Tokyo, December 24, 1958.)

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### REACTION TO NORTH PACIFIC SALMON CONFERENCES:

The annual meeting of the International North Pacific Fisheries Commission, held at Tokyo from October 20 to November 10, 1958, received extensive and detailed coverage from the general press, as well as the trade papers, while it was in progress, and a number of interesting summaries and evaluations of its work have appeared since its conclusion.

Japan-Soviet fishery negotiations began at Tokyo on January 12. The press is predicting difficult negotiations. Press reports show that Japan's negotiators enter the conference with a set of well-justified demands for relaxation of restrictions on every aspect of the fisheries covered by the Japan-Soviet treaty.

The opening of the tripartite conference with the United States and Canada in October was preceded by a number of articles and editorials predicting that the United States would renew its demands for a westward shift of the provisional abstention line, on the grounds that its present position at 170° W. longitude allows the Japanese high-seas fishery to take large numbers of "American" salmon.

At the end of the conference some editorial writers (Japan Times of November 13, Asahi of November 12) took approving note of the Commission's American-sponsored recommendation of conservation measures to the contracting parties, stating that Japan was, of course, prepared to do her part, as long as it involved no undue restrictions on her fishing rights. Numerous writers praised the part played by Japanese scientists. It was pointed out that if these scientists are to be as successful next year, when the problems left unresolved by this meeting must be taken up again, they will need more financial support for their research than they have had in the past; and the hope was expressed that the Commission meetings would continue in the future on as "scientific" a basis as this year.

Tokyo Shimbun was still dissatisfied, and its editorial of November 14 expressed the view that the conference should have ended in a complete retreat of the United States from its demand for a westward movement of the abstention line. Any additional restriction on Japan's salmon fishing, the editorial concluded, would be intolerable, in view of the fact that the tripartite pact is "fundamentally . . . an unequal treaty concluded as part of the Allied occupation policy and under conditions disadvantageous to Japan."

Even before the North Pacific Fisheries Commission meeting ended, committees of the salmon and king crab sections of the Japanese industry had begun meeting on November 7 to formulate the demands which they wish their government's representatives to present to the Russians in January. On that date the Nihon Keizai Shimbun predicted that the industry would seek a narrowing of the closed areas along Soviet shores (20 to 40 miles wide this year), abolishment of the special red salmon conservation area off northeastern Kamchatka, and relaxation of restrictions on length and spacing of gill nets. The paper pointed out, however, that the Russians were likely to come out strongly for an enlargement of the treaty area and additional restrictions, in view of the poor Soviet catch in 1958, the fact that Japan takes over 100,000 metric tons of salmon on the high seas outside of the present treaty area, and the Russian belief that Japanese vessels do a great deal of illicit fishing north of the treaty line.

Tokyo Shimbun, on November 12, also thought it certain that the Russians would ask for a southward extension of the treaty area to take in more of the land-based gill-net and long-line fisheries. This would, in the newspaper's opinion, make for drawn-out negotiations as the Japanese would stand on "the freedom of the seas" and their belief that most of the salmon south of the present treaty line do not originate in Soviet territory. The abundance of pink salmon in the western North Pacific, it was pointed out, fluctuates in a two-year cycle, and 1959 is supposed to be a year of high abundance. In the last such year, 1957, Japan got a 120,000-ton catch quota, and she should get at least as much this year, plus something to compensate for giving up the Sea of Okhotsk, for a total, say, of 130,000-140,000 tons as a minimum. According to Tokyo Shimbun, the Japanese Fisheries Agency feels that the 1958 season's experience shows that regulations by separate species does not work, this year's separate red salmon quota having resulted in a serious cut in the chum salmon catch. The paper predicted that the Japanese delegation in January would include the Chief of the Fisheries Agency's Production Division and the Vice-President of the Japan Fisheries Association, both of whom were active in the North Pacific Fishery Commission meetings; and the counselor of the Foreign Office's European Affairs Bureau.

The Japan Times, on November 13, stated that the three main questions to be brought before the conference would be

## Japan (Contd.):

the extent of increase in the catch quota over 1958's 110,000 tons, the dropping of separate species catch limits, and the cutting down of closed areas.

On November 27 the Nihon Keizai Shimbun reported the Northern Mothership Council as being strongly in favor of asking for a 170,000- to 175,000-ton catch quota, and relaxation of other restrictions. In justification it was stated that it is premature to conclude that the resource is declining, that the difficulties in filling the 1958 catch quota were due to bad weather and abnormal ocean conditions, that high-seas fishing has less effect on salmon resources than does inshore fishing, and that about 600,000 Japanese depend on the salmon and king crab fisheries. The special red salmon catch quota should be dropped, or at least increased to 27,000 tons, and the closed red salmon conservation area off north-eastern Kamchatka should be abolished or the time of closure postponed 10 days to August 1.

On November 29 the Nihon Keizai reported that government officials had begun deliberations on the industry recommendations. The tone of the article was pessimistic, in that the Russians were expected to take a severe attitude and ask for enlarged closed areas and a smaller quota. It was reported that the Japanese government would like to speed up the negotiations, which in 1958 dragged on for 2-1/2 months, perhaps by having the deliberations of the biology committee proceed simultaneously with those of the commissioners, as is done in the case of the Tripartite Treaty. It was held desirable that a quota request greater than that for 1958 (145,000 tons) be made, on the grounds that 1959 is a year of abundance for pink salmon, but it was predicted that the Soviets might come out with a starting figure as low as 60,000 tons.

The Asahi and the Suisan Keizai Shimbun of December 4 reported a meeting the previous day of the industry committee concerned with the king crab part of the negotiations. Here the line agreed upon was that four crab cannery ships and a production quota of 320,000 cases, the same scale of operations as in 1958, is the minimum acceptable to the Japanese industry. Furthermore, the industry was reported to want abolition of the existing seven closed areas on "migration routes" as meaningless, a change of the present required interval between nets from 100 meters to 30 meters, and elimination of differences in the amounts of gear that may be set and the permissible catches of female and immature crabs at different times of the season. The area south of 53°N. latitude, which at present is completely closed, is thought by the Japanese to be potentially a rich king crab fishing ground. They want a thorough survey of this area made, looking forward to opening it in 1960.

Suisan Keizai Shimbun of December 6 and Nihon Suisan Shimbun of December 12, two fisheries trade papers, pointed to an article in the Soviet fisheries journal Rybnoe Khoziaistvo's September 1958 number, in which it was reported that most of the fishery combines in the Soviet Far East had exceeded their production targets for salmon in the first half of 1958, and that those which did not had failed to get their gear in operation in time for the season.

On December 16 the Asahi and several of the English-language papers reported that the Japan Fishery Association's special salmon subcommittee had, on the 15th, decided tentatively to ask the government to negotiate for a 165,000-ton salmon catch quota, leaving the other issues for further discussion at a meeting on December 19. The Nihon Keizai Shimbun, reporting the same story, pointed out that the industry had asked for the same tonnage in 1958, supposedly a poor year for pink salmon. The explanation advanced was that failure to ask for a greater quota for 1959 was due to the report of the Japanese observation team which toured Kamchatka in August and found the fisheries there in poor condition, and to the anticipated attitude of the Russian negotiators. It was stated clearly that the Japanese industry does not expect to be able to get 165,000 tons. On the basis of the ratio of industry demands to the government's demands to what was actually wrung out of the Soviets in past years, it would appear likely that a quota of 110,000 tons may come out of January's bargaining. However,

the paper stated that what the industry really wants to get is 120,000 tons, the same as last year ("because 1959 is a rich year"), plus 10,000 tons as compensation for giving up the Sea of Okhotsk, for a total of 130,000 tons.

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## SALMON INDUSTRY EXECUTIVE'S VISIT TO RUSSIA:

The President of the Hokkaido Fisheries Public Corporation went to Moscow in November 1958 to discuss his plan for using Japanese fishermen in a joint Japanese-Soviet salmon fishing venture in Soviet waters. Though he got little encouragement for his project, he brought back reports of some significant Russian comments on Japanese-Soviet fishery relations.

Since Japan regained her independence the Japanese fishing industry has developed a number of schemes for getting back into the coastal salmon fishery in Soviet territory. Although none of the schemes was accepted, the pressure for such schemes still exists because Japan has more salmon fishermen and fishing boats than the present mothership fleet operations can use.

The latest plan for bringing this excess fishing potential to bear on the coastal salmon resources of the Soviet Far East is the "Takano scheme" of the President of the Hokkaido Gyogyo Kosha, a public corporation which operates a salmon mothership fleet. This plan calls for the utilization of "unexploited resources" and the relief of depressed Hokkaido fishermen by formation of a joint Japanese-Soviet enterprise to fish within the coastal areas, some of them extending 40 miles offshore, that are closed to Japanese fishermen under the present fishery treaty between the two countries. The salmon produced by this operation would all be sold to the Soviet Union.

In September 1957 the President of the company was informed by the Russians that they were considering his plan, and he received an invitation to come to Moscow to discuss it. It was not, however, until November 14, 1958, that he finally left for his trip. In press interviews he showed little confidence that the Russians would accept his plan. He stated that he had other reasons for making the trip, most importantly to lay before the Russian fishery authorities the plight of Hokkaido's fishermen and to voice their protest against the closing of the Sea of Okhotsk to Japanese salmon fishing.

When he returned to Japan on December 8, 1958, his report to the press indicated that he had been unable to see the Soviet fisheries chief who was attending a whaling conference in London. He presented his case to a Soviet Commissioner on the Japan-Soviet fisheries commission.

When the Japanese visitor asked for reconsideration of the Russian position that has tied the issue of "safe fishing" (that is, safe from arrest by Soviet patrol boats) around the Kurile Islands with the conclusion of a peace treaty, the Russian Commissioner stated that the Soviet Union was being as cooperative as it could, but that Japan showed no response. The Soviet Union is exerting itself to conclude a peace treaty as soon as possible, and wishes that the Japanese fisherfolk would also bend their efforts to the same end.

On the main point of the visit, the joint fishing scheme, the Russian stated that he would inform the Russian fisheries chief, and then remarked that conditions had changed since the scheme was first proposed. The Japanese visitor took this to mean that because of improved economic conditions in the Soviet Union, the Russians no longer feel any need for Japanese cooperation in the fishing industry. The Russian said he understood the Japanese visitor's desire to give employment to the depressed Hokkaido fishermen, but hinted that if the Japanese want a joint operation, they must change the form of their proposals.

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**Japan (Contd.):****TUNA INDUSTRY AND  
CONTROL OF ATLANTIC  
TUNA FISHING AND EXPORTING:**

The decision of the Japanese Government to permit landing of tuna in foreign countries for export to the United States has developed problems within the Japanese tuna industry between vessel operators who have been fishing the Atlantic and those who want to send their boats into that area for the first time. At the same time, freezers and exporters of tuna in Japan have been trying to retain their control of this trade against the growing practice of direct export of fish frozen aboard fishing vessels.

On September 2, 1958, the Japanese Fisheries Agency published an order permitting Japanese fishing boats, under special license for each trip, to land fish in foreign countries for export to the United States. This practice had been previously strictly restricted, partly out of fear of stimulating the opponents of Japanese tuna imports in the United States, and partly because of opposition from freezers and exporters of frozen tuna in Japan. The new order reflected the interest of Japanese fishermen in the rich new tuna grounds of the Atlantic; a growing demand from tuna canners in Puerto Rico and the eastern United States; the development of plans for transshipping tuna to the United States from various points in the Caribbean; and the fact that the Italian market was about saturated with Japanese tuna.

As originally written, the order limited the right to engage in such "direct export" to vessels which had already received permits to land Atlantic tuna for export to countries other than the United States, such as Italy or Brazil. This proviso was cancelled by a Fisheries Agency order on November 8, 1958, in effect throwing open the Atlantic to boats which had no previous record of operation there.

Since this change in the regulations was made, a struggle has been going on between the vessel operators who want to go into the Atlantic grounds for the first time, their cry being "equality of opportunity," and the pioneers who, as

they say, explored and developed those grounds at great cost and risk, and who consequently want some special rights in their exploitation.

At the same time a more severe contest has developed between "land freezers" and "shipboard freezers" over the share that each is to have in the future of the Japanese frozen tuna export trade. In the past few years the number of large tuna boats equipped with freezing machinery has increased rapidly, and their operators have tended to send them to the far grounds of the Indian and Atlantic oceans, where tuna are abundant and catches good. Since it is not economically feasible to fish such distant grounds from bases in Japan, the owners of these freezerships have sought every opportunity for landing their catches in countries closer to the fishing areas--first in Italy, then in Brazil, Morocco, Cuba, Haiti, Panama, Israel, and elsewhere. The result is that firms (the "land freezers") which hitherto bought fish in Japanese ports and froze them for export by freighter are faced with a dwindling supply of raw material and see their markets abroad being supplied more cheaply and efficiently by the freezerships through direct export or transshipment. The present struggle is an effort of the land freezers to impose a yellowfin tuna export quota on the freezership operators, who in turn are trying to capture for themselves a larger share of the export trade.

At the most recent meeting, on December 13, of a special committee which the tuna freezers' association has set up to work out the regulation of yellowfin exports to the United States, the freezership and land-freezer factions continued to be completely deadlocked, according to the *Suisan Tsushin* of December 15. The freezerships reportedly advanced a plan under which clippers landing tuna aboard for transshipment to the United States would be limited to two such landings per ship each year within a total limit of 120 landings for the whole fleet. As the 64 freezerships now in operation average 350 tons capacity, this would put a ceiling on landings for transshipment of about 42,000 tons (with something like 35,000 tons thought more likely to be the figure actually attained). Assuming this is

## Japan (Contd.):

accepted, the freezership operators estimate that landings of yellowfin in Japan next year would be 98,700 tons, of which 40,500 tons would be for export, thus splitting the yellowfin exports to the United States almost evenly between freezerships and land freezers.

To this the land-freezer faction replied that they had a right to demand as their annual export quota a total of 50,000 tons, based on the 1958 estimated shipments of 45,000 tons of yellowfin plus 5,000 tons of skipjack and big-eyed tuna to the United States. They pointed out that if the 42,000-ton quota claimed by the freezerships was added, the total would be nearly 50 percent higher than the 60,000 tons that the United States market could be expected to take next year.

According to Suisan Tsushin, despite this basic opposition between the views of the two groups, talk in the trade is that the attitude of some of the land freezers is beginning to show signs of softening under pressure from the trading firms, which have been active in development of the transshipment exports of freezership fish, and the possibility of a sudden settlement of the problem is not ruled out. The land freezers' initial demand for an over-all yellowfin export quota seems already to have become unrealistic, and the main question remaining is whether or not to set up a quota just for exports from the homeland. The Suisan Tsushin expects the establishment of such a quota to be difficult because of opposition from vessel operators.

The freezership owners' insistence on a system of regulation which more or less guarantees vessels going to the Atlantic two chances to land fish for export to the United States is apparently due to their belief that this is the minimum necessary to make such a cruise pay. A report of a panel discussion of the tuna fishery's problems by a group of vessel operators, held at Misaki on November 18 and printed in the Suisan Shoho of November 25, bears this out. In the article, which contains a wealth of gloomy data on the decline of tuna catches in all areas,

the head of one fishing company's Misaki office states that his firm's 1,200-ton freezership must make four fishing trips on an Atlantic cruise to make money, the ideal plan of operation being one landing of 600 tons in Italy, two landings totaling 1,600 tons in Panama, and a landing of 900 tons on return to Japan. Such a cruise requires about one year and two months, and grosses about US\$700,000. The same authority claims that for a financially-successful Atlantic cruise by a 700-ton freezership, two deliveries totaling 800 tons to Italy, one of 400 tons to Panama, and one of 400 tons on return to Japan are required.

## Republic of Korea

## FISHERIES TRENDS, DECEMBER 1958:

**Shrimp:** The program to produce frozen shrimp for export is progressing satisfactorily and some excellent packs were being accumulated for future export. Several companies are very much interested in the possibilities of frozen shrimp and are preparing to enter into this market. The fishing firm that had packed 4,500 pounds of frozen shrimp under United States Army Inspection Regulations completed a second contract for 4,000 pounds for the United States Army. Another firm has constructed a shrimp-processing plant adjacent to an ice plant in Pusan. The buildings and installations are patterned after a pilot plant developed by the Central Fisheries Experiment Station. Shrimp are now being packed for domestic and export sale. A third firm at Pusan Jin is constructing a frozen seafood packing plant adjacent to its ice plant. This plant was also being built to standards recommended by the Central Fisheries Experiment Station.

**Standards Program:** A series of meetings were held with the Director of the Korean Fisheries Service and United States fisheries advisors to finalize the draft for the proposed Ministerial order setting up standards for the inspection of frozen fish and shellfish for export. The proposed regulations set up standards for processing facilities, processing procedures, and conditions for inspection which will meet both United States military and United States Food and Drug Administration requirements. The standards are being examined by a legal staff prior to being submitted for promulgation.

A training course was held at the Central Fisheries Experiment Station in November to teach inspectors of the Central Fisheries Inspection Service how to conduct inspections under the new regulations. Inspectors from Pusan, Seoul, Pohang, Mokpo, and Yousu attended.

**Fishing Fleets:** Plans and drawings for an improved medium-size fishing vessel were developed by the Office of Marine Affairs and United States fisheries technicians. Lists of fishing boats in need of repairs and/or modernization have been prepared. Efforts on the part of a United States fisheries technician to assist the Korean fishing industry to obtain more modern fishing vessels has made it necessary to initiate action to have the Korean vessel inspection laws revised and brought up to date. Draft of the proposed revisions are being prepared.

**Halibut:** Following the successful program to develop shrimp processing, efforts are now being made to develop a species of halibut for processing and marketing. At present this species is not utilized to any extent in Korea. Sample packs are being prepared and, if acceptable, the exploitation of these species

### Republic of Korea (Contd.):

could be the means of increasing substantially the Korean catch.

This fishery would provide a needed incentive to keep trawlers active during the summer season when they are normally inactive.

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### FISH-LIVER OIL INDUSTRY:

Fish-liver oil plants located in the Republic of Korea produced about 150 metric tons of fish-liver oil in 1957. From April 1957 to April 1958, 1,142 drums of fish-liver oil valued at US\$128,385 were exported mostly to Japan. In terms of vitamin A units, the annual fish-liver oil production is about 3 to 4 trillion units and the export value is just under 4 U. S. cents a million units.

Exports of fish-liver oil by Japan are estimated at about 100 trillion vitamin A units. As about all the Korean production is exported to Japan for further refining or resale, Korean production amounts to about 3-4 percent of the Japanese export supply.

In early 1958 the Japanese fish-liver oil industry was overstocked and upset by a declining market. But, by late August, following an either poor or curtailed spring and summer production, the supply and demand situation improved. The world market for fish-liver oils, due to declining demand, is apparently quite sensitive to any oversupply.

The principal Korean raw materials are livers from sharks, Alaska pollock, and cuttlefish (very low vitamin A content). All the raw materials used for fish-liver oils are byproducts from the food fish industry and processors are able to obtain the raw livers at low prices of 0.5-3 cents a pound. The cost of the raw material in terms of vitamin A units is not more than 2 U.S. cents a million units. This low unit cost gives the Korean producer a favorable competitive position, even in a declining market, according to an October 23, 1958, report from the International Co-operation Administration Fisheries Mission to Korea.



### Mexico

#### BUREAU OF FISHERIES MAY BE TRANSFERRED TO MINISTRY OF INDUSTRY AND COMMERCE IN 1959:

The Mexican Bureau of Fisheries, now in the Ministry of Marine, may be transferred in 1959 to the newly-created Ministry of Industry and Commerce which will be a modified and strengthened version of the present Ministry of Economy. This proposal was before the Mexican Congress in December 1958.

The new legislation would transfer all fishery functions to the Ministry of Industry and Commerce which, among other duties, would be empowered to: supervise production, distribution and consumption; develop, jointly with the Ministry of Foreign Relations, foreign trade; study, project, and determine, in accordance with the Ministry of Treasury, duties; study and determine the restrictions for import and export items; fix maximum prices and define the preferential use that must be given to determined merchandise; give technical advice to private enterprise for the establishment of new industries; supervise sales when national products are sold directly to foreign buyers; supervise the organization and development of all types of cooperatives; supervise, within the terms of the law, mercantile societies, chambers, and industrial associations; protect and develop the marine, fluvial, and lacustrine fauna and flora; authorize fishing contracts, concessions and permits, and those for the exploitation of other marine resources; establish closed seasons for the conservation and increment of the different species of fish and establish hatcheries and reserve areas; promote the industrialization of fishery products and the establishment of canneries and freezers; give technical advice to associations of fishermen; supervise the formation and organization of the fishery fleet; carry out scientific explorations and collections of the aquatic flora and fauna, as well as the resources of the sea; and establish experimental stations and oceanographic laboratories.

The proposed legislation would combine in one Ministry practically all of

**Mexico (Contd.):**

the functions pertaining to fisheries which, in the past, have been dispersed between three. It would also increase the obligations and powers of the executive branch with respect to fisheries. From an overall point of view, if properly administered and financed, the Mexican Bureau of Fisheries, under this new legislation, would be in a position to do a great deal towards the development and conservation of Mexico's aquatic resources (United States Embassy in Mexico City, December 11, 1958.)

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**MERIDA SHRIMP FISHERY****TRENDS, DECEMBER 1958:**

The shrimp fishing industry in the Campeche and Ciudad del Carmen areas of the Gulf of Mexico suffered from a year-long slump in 1958 due to lower catches, overexpansion, and bad weather. Sudden storms in mid-December resulted in the sinking of several vessels and damaged many others at the docks. The cost of repairs from one storm in the Campeche area totaled about 4 million pesos (US\$320,000). Additional expenses for the repair and replacement of shrimp fishing gear caused further losses. (United States Consulate at Merida, January 2, 1959.)

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**VERACRUZ FISHERY TRENDS,  
OCTOBER-DECEMBER 1958:**

During the last quarter of 1958 landings of fish and shellfish from Veracruz's Gulf of Mexico fisheries were down due to bad weather and the scarcity of shrimp on the fishing grounds. However, higher prices paid to the fishermen helped to compensate for the lower catch.

The mackerel (probably king or Spanish) catch for the September-November 1958 season amounted to 663 metric tons as compared with a catch of 1,033 tons in the 1957 season. Catches continued low during December due to many days of northerly winds. Prices were higher and the total value for the 1958 season was about the same as for the previous year. Minimum ex-vessel prices September-

November 1958 for mackerel were about 3.6 U.S. cents a pound, or substantially higher than the 1957 season price of 1.1 U.S. cents a pound.

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**WEST COAST SHRIMP FISHERY  
TRENDS, DECEMBER 1958:**

In October 1958, shrimp landings on the Mexican west coast in the Nogales area gave indications of exceeding the average for the past few years. Later in the season, for some unexplained reasons, landings dropped off, and it is predicted that the annual production will be about average.

Shrimp prices have been firm since the beginning of 1958, with slight fluctuations downward for the smaller sizes. This fluctuation is attributed to heavier landings of shrimp in those grades. (United States Nogales Consulate report, December 29, 1958.)

**Morocco****AGAR-AGAR INDUSTRY:**

As of the end of 1958 only one company was producing agar-agar in Morocco, but another company formed in July 1958 should begin production in 1959. The new company is capitalized at 10 million francs (US\$24,000) and has a board of directors made up of Moroccan, Spanish, and French citizens.

The company in production in 1958 produced 200 metric tons during that year and expects to expand its exports to 300 tons in 1959 with the help of enlarged facilities.

Exports of agar-agar in 1957 amounted to about 296,000 pounds valued at US\$351,000. The United States was the principal buyer of Moroccan agar-agar in 1957 with 111,000 pounds valued at US\$136,100; followed by France, 40,700 pounds valued at US\$52,500; Great Britain, 36,700 pounds valued at US\$44,100; Argentine, 33,500 pounds valued at US\$38,700; and West Germany, 27,000 pounds, valued at US\$30,700. Eight other

**Morocco (Contd.):**

countries took the balance of the exports in 1957.

On August 24, 1957, the Moroccan Government informed exporters that gelidium algae could no longer be exported from Morocco. The Government's policy is believed to be to protect the agar-agar producer by assuring a three-months supply of gelidium algae before licensing any exports of the raw material (United States Embassy in Casablanca, dispatch dated December 29, 1958.)

Note: Values in US\$ calculated at rate of 420 Francs=US\$.1.

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**EXCLUSIVE UNITED STATES IMPORTING RIGHTS FOR SARDINES****GRANTED TO NEW YORK CITY FIRM:**

An official of the Moroccan Office Cherifien de Controle et d'Exportation, an office of the Ministry of National Economy (which, among other tasks, is charged with quality control of certain exports) reported on January 12, 1959, that a New York City importer recently obtained exclusive United States importing rights for Moroccan sardines. The New York importer has agreed to buy 70,000 cases. He also is to be responsible for an advertising campaign on behalf of Moroccan sardines with an annual budget of about US\$47,620. The New York importer plans to market the sardines under his own brand.

The number of cases of sardines exported from Morocco to the United States was 30,438 cases in 1955, 36,914 in 1956, 19,367 in 1957, and 14,491 through October of 1958. The 70,000 cases to be imported by the New York City importer therefore represents a significant increase.

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**STATUS OF FISHERIES:**

Since the Moroccan fishery industry exports most of its production, its principal role in the economy is a source of foreign exchange and employment. Of the 1957 catch, only 14 percent was sold fresh, and the rest processed in some way, almost entirely for export. The severity of the greatest problem of the industry, that of finding markets, is

shown by the fact that the sardine-canning industry, the most important of the processing industries, was able to export in 1957 only half of the 2.6 million cases produced. The rest, except for the small amount sold in Morocco, remains unsold.

The value of the fishery products exported in 1957 was 10,364 million francs (about US\$24.7 million) which was about 9 percent of the value of all exports from Morocco. Although most of the fishery products were exported to France and the franc zone, some 38 percent went elsewhere and the United States alone bought one-fourth of the fish meal produced in 1957 for 136 million francs (US\$324,000). This is important to Morocco's policy objective of increasing trade outside the franc zone.

The fish-processing industries (canning, fish meal, fish oil, freezing, and salted fish) employ 17,000 workers in an average year. About 10,000 more are employed as crewmen on the fishing vessels and to man the large stationary tuna nets (madragues).

The work is seasonal for the commercial fleet and the number of persons employed depends upon the size of the catch and the availability of markets. At present, many fishermen are unemployed, not for lack of fish but of markets. The labor force for the processing plants is recruited each year for 4 or 5 months and is neither stable nor skilled.

The only species of fish caught in volume by Morocco are sardine and tuna. The other species are for the most part caught by trawlers and smaller craft for sale fresh.

**Sardine Fishery:** Sardines can be caught off the Moroccan Atlantic coast at any time of the year. The fishing season is, however, limited by Government regulations to a variable period during the spring and summer. The sardines migrate north during the summer so that the season is later in the northern ports. The fish also become fatter as they follow the coast northward and the fish oil producers of Agadir, the southernmost port pay two francs (about 0.2 U.S. cent a pound) less per kilogram (2.2 pounds) than do those of Safi, some 200 miles up

## Morocco (Contd.):

the coast, to compensate for the lower oil yield.

By far the largest amount of sardines are caught by vessels operating from Safi and Agadir and covering the southern third of the Moroccan Atlantic coast. Averaging 23 tons, the sardine vessels work within 6 or 7 miles of land in water up to 200 meters deep. Although trawling nets are sometimes used, the usual equipment is a type of purse seine ("cerco"). A weight is dropped to sink one corner of the triangular net. Another corner is secured to a small boat and the third corner dragged around the school of sardines in a circle.

The boats are seldom out more than a day at a time with the exception of a very few larger ships which work the Mauritanian coast. Most captains navigate through visual contact with the land. Heavy fogs cause much distress. The sardine fleet is equipped with sonic fish-detecting devices, and nylon nets are coming into use. Some of the boats date back to the 1920's, however, and are small and slow.

In September, the Al Mochrid, an experimental vessel of the Scientific Fishing Institute (Institut Scientifique des Peches Maritimes) arrived at Casablanca from Hamburg, equipped for electrical fishing. It had been tested in the North Sea, reportedly with some success. The equipment consists of an electrical apparatus and a pump. A projectile given a positive charge through a connecting cable is fired into the middle of a bank of sardines from a compressed air cannon. Alternating current is used and an electric field established between the positive pole of the projectile and a negative pole at the ship. The fish's nervous system is affected, paralyzing it and then it is drawn toward the positive pole along the electric field. The projectile is drawn to the ship and the electric charge shifted to the mouth of a tube ( $5\frac{1}{2}$ -inch diameter). The fish are then pumped into the ship alive. One advantage of this technique is that no lactic acid is formed in the system of the sardine, affecting the flavor, which results ordinarily from the struggles of the netted fish. Other advantages

are the saving of the cost of nets, and the ability to fish at night and at considerable depths.

Tuna Fishery: The tuna season is during June and July when the fish arrive at the Moroccan coast between Fedala and Larache from the southeast. They then go up the coast to the Straits, and back out to sea around to the south. The tuna caught in the Mediterranean are a different species (skipjack) from the tuna caught off the Atlantic coast.

Tuna are caught in two ways, from ships and with stationary tuna nets (madragues). The latter method is the more important, accounting for about two thirds of the catch. The largest operation is near Kenitra (Port-Lyautey) where there is also a processing factory which prepares the fish for shipment either to canning factories in Morocco or abroad frozen. There are three other nets in the Northern Zone and one on the Mediterranean coast. A sixth net is to be placed near the Fedala port.

Fishing from boats, the tuna are caught by trolling with multiple hooks, or similar to the American method, with poles and very short lines. The Al Mochrid was built as a tuna boat adapted from the Pacific Coast American tuna boats. Also, the same boat was equipped last year with a large nylon tuna net made in Japan. The net measures 570 meters in length by 75 meters wide. There is some speculation as to the use of electrical fishing for tuna although without the pump.

The haul-net and line fleets are less modern than the commercial sardine fleet. The efforts of the Scientific Fishing Institute have been directed, principally toward the industrial sardine fleet, and the trawlers and line vessels use the old methods. A few small boats provide fresh fish to other Moroccan ports. The Government is engaged in improving this fleet (along with its campaign to increase consumption) and has made loans to several owners.

Processing, Marketing, and Distribution: The fishery industries in Morocco can be divided into two parts. Less important is the catch for sale fresh locally or for export frozen or refrigerated. Nearly

**Morocco (Contd.):**

all of the exported products go to France. Most of the trawler fleet operates from Casablanca and is for the most part owned by the captains who sell their catch every morning to the export packers and distributors. The only other port having a sizable fleet in this industry is Agadir, from which most of the catch is shipped to Casablanca for export. The largest packing and distributing company is presently operating its boats from Dakar rather than Casablanca, partly because the company was having serious difficulty with the labor union representing the boats' crew. One of its two largest trawlers recently sank in the Mediterranean under somewhat mysterious circumstances.

The sardine and tuna industries are by far the more important segment of the fishery industries. The boats in the fleet are owned either by the canning companies or by contractors with the companies. The factories are grouped into several combines and the trend is toward further concentration. This is opposed by the government because the result seems to be a movement away from the port of Agadir, and toward Safi, causing distress among Agadir fishermen and cannery employees, championed by their labor unions. The concentration of the sardine industry in Safi would seem to make good economic sense; the fish themselves are of better quality, the transportation is cheaper from Safi to Casablanca (the exporting port), and the working force is reputedly more stable and better skilled.

According to the Director of the Marine Marchande et Peches Maritimes, the 1958 fish-canning factories in Morocco are divided by port as follows: Safi, 70; Agadir, 49; Casablanca, 18; Essaouira (ex-Mogador), 8; Fedala, 7; Kenitra (ex-Port-Lyautey), 2; Rabat, 2; and El Jadida (ex-Mazagan), 2.

For several years, since the boom years of 1949-1952, when the number of cannery factories more than doubled and sardines could be sold easily on the world market, Morocco has had a larger industrial plant than could be fully employed for the existing market. In 1957, for ex-

ample, 17 of 63 factories located in Agadir were operating. A high percentage of fishermen have been unemployed, sometimes as many as 80 percent of the number active in 1949-1952. These conditions existed in spite of the fact that the Moroccan Government assigns quotas to factories and boats to keep as many operating as possible as well as to limit overproduction. In one week during April 1957, 200 metric tons of sardines were thrown back into the ocean. And yet, 1.3 million cases, half the sardine pack, was not sold when the 1958 season began.

In an attempt to enlarge the United States market, for example, several American importers of sardines were invited to see the Moroccan industry at first hand. Also a comprehensive survey of the American market was published in Morocco in 1958, aimed at increasing Morocco's share of the market by some 500,000 cases a year.

In another direction talks will soon begin with a Cuban economic mission, the aim of which will be to increase Morocco's export of canned sardines to help pay for her import of sugar.

Morocco is favored in the French market with a customs-free import quota of 12,000 metric tons of canned fish, which is about two-fifths of the total export of canned fish from Morocco in 1957. Some people in the fishery industries believe that it is because of this quota that the canneries are able to make an acceptable profit. The cost of a case (100 cans of  $3\frac{3}{4}$  oz. net) of sardines is about 4,000 francs (US\$9.52). These cases are sold for 6,000-6,500 francs (US\$14.29-15.48) in France, at 4,000 francs or less elsewhere.

The prices at which fish are sold to the canneries and byproducts industries are set by a Central Fishing Committee (Comite Central des Peches Maritimes), which meets yearly before the beginning of the fishing season. The Committee is made up of representatives from the Government, the canning and byproducts factories, the exporters, and labor.

Government Policies and Programs  
and the Potentialities of the Industry:

## Morocco (Contd.):

The crucial problem in developing the fishery industries is and will continue to be that of finding markets. Why is it that Morocco cannot seem to compete effectively on the world sardine market? In most years fish are plentiful and of good quality. Labor is fairly cheap and the Government wants to increase the export of fish products. Building up export markets for a product is often difficult, but considerable efforts have been made to do so for sardines, which are the principal fishing export. Part of the blame must go to the canners, who have in the past had a sellers' market and did nothing to maintain their markets.

It is also possible that the producers have not been sensitive enough to the specific preferences of the market; i.e., packaging and packing, in which may be included the number of sardines in the can, the kind of oil in which the fish are packed, whether the fish are whole or skinned and boned, etc.

Publicity would presumably be necessary to gain wider acceptance of Moroccan sardines. For the United States, a market study has been made as a basis on which to mount a campaign. It is doubtful, however, that the producers in Morocco are either able or willing to invest much money in building markets. Most of the capital involved is French, and the factory owners are not certain enough of their position in Morocco to know whether long-term investments will pay off. The factories are not large or heavily-machined, and were paid for during the good years (1949-1952), so that the owners seem little interested in taking other than a short-run viewpoint.

Aside from publicity, the price and quality of the product are most important in marketing. In 1952, Morocco exported sardines of dubious quality and suffered a loss of markets a year later. This event is credited with partially closing United States and British markets.

The price of fish products is a more complex matter. The cost of factory labor, while cheap by the man-hour, is actually expensive because of the inexperience and lack of incentive of the labor

force. Most of the workers are women from the country who may or may not have worked in the factories before. During the past season in Agadir, the most successful packer was a Portuguese who arrived on the scene only two years ago. He expressed the opinion that relative to Portuguese female cannery employees, his local labor force was about one-third as efficient. In Portugal he noted that extensive training is required of them, not to mention the differences in level of culture, education (to some extent), health, sense of organization, etc.

The cost of the labor of the fishermen is also becoming expensive. They work on shares, and at present about 60 percent of the day's catch goes to the crew. The price is set by the Central Fishing Committee in which the labor union participates. For political reasons, the Government is sympathetic to the demands of the union, which increase each year. For example, a 35-percent increase in the price of fish was asked in 1958 although a lesser increase was obtained. The fishermen already have accident insurance partly paid for by the shipowners and are now asking for health insurance as well.

In 1957, the byproducts price was 5.5 francs a kilogram (about 0.6 U.S. cents a pound) for fish, which made it difficult for the factories to operate. At the time the price was set, the byproducts industry notified the Committee that the price was prohibitive. When a large catch was made and the cannery factories were unable to accept the whole catch for fear of over-production, the surplus was thrown back into the sea. It is reported that the fishermen would have been willing to accept a lower price rather than lose the fish. All the same, the labor union in 1958 demanded 9.5 francs per kilo (1 U.S. cent a pound). It is clear that if the byproducts industry could buy fish at a lower price, it could serve as an economic adjuster and absorb surplus fish in years of plenty.

Another factor affecting the price is the degree of concentration of the factories into combines in order to make the most economic use of existing facilities. However, the Government supports the labor union in resisting concentration because of the hardship it would work on the

**Morocco (Contd.):**

Agadir fishermen. The control by the Government (Sous-Secretariat du Commerce et de la Marine Marchande) over the amount of concentration is its power to allocate production quotas between producing facilities in Agadir and Safi.

Most of the Government's plans and policies are directed toward a larger fish catch. It sponsors the Scientific Fishing Institute, grants loans for the modernization of the fleet, and rebates taxes on fuel used by the fleet. But the problem is not a shortage of fish, and a larger catch will only further glut the market. The only Government-sponsored programs aiming to better the marketing situation are: (1) a campaign to increase Moroccan consumption by better distribution and lower prices; (2) research by the Scientific Fishing Institute on fish meal for human consumption; (3) the possibility that electric fishing would be more efficient and thus lower the cost of fish to the factories; and (4) various trade agreements with other countries to accept fish products in return for imports to Morocco. The trade agreements, however, do not create markets, and still depend on actual market conditions for their fulfillment. The other programs have not made much progress so far. (United States Consulate report from Casablanca, September 22, 1958.)

**Netherlands****PLANS NEW FACTORY-TYPE FISHING VESSEL:**

Fishing circles in the Netherlands are considering the possibility of constructing and operating a combined fishing-factory vessel with a capacity of 2.6 million pounds of frozen fish per annum for domestic consumption. Expansion of capacity for export is not presently considered advisable, although it is hoped that such possibilities might be increased as the Euromarket develops. A vessel of the present British Fairtry-type of 2,605 gross registered tons was rejected and a smaller one appears to present better possibilities for economical operation. Construction and operation of the vessel

would require Government support. (United States Consulate report from Rotterdam, December 19, 1958.)

**Norway****FISHERY LANDINGS DOWN IN 1958:**

The 1958 Norwegian fishery landings of 1,215,000 metric tons (about 2.7 billion pounds) were the lowest since 1949 and down about 770,000 tons from the record catch of 1956, according to preliminary figures released by the Norwegian Directorate of Fisheries. The value of the landings in 1958 was estimated at about 565,700,000 kroner (US\$79.2 million).

The drop in the landings for 1958 was due almost entirely to the failure of the winter herring fisheries which yielded only 345,000 tons as compared with about 800,000 tons in 1957 and over 1,100,000 tons in 1956.

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**KELP MEAL USED AS ADDITIVE TO ANIMAL FEEDS AND SOIL CONDITIONERS:**

A meal ("algit") made from mineral and vitamin-rich Norwegian seaweed is finding ever wider acceptance among American ranchers and farmers. Distributed by a Chicago, Ill., firm, this product is used as a feed supplement for all kinds of animals and as a conditioner for all types of soil.

As made by a Kristiansand, Norway, manufacturer, kelp is ground and sun-dried to less than 20 percent moisture, to retain a maximum of the inherent minerals and vitamins. The finished product contains at least 60 minerals or elements, over 12 vitamins, and 21 amino acids, all in balance. Added to animal feed, the product protects against deficiency diseases, thus helps to keep hogs, horses, cattle, poultry, and mink in top condition.

Several United States agricultural colleges and private research institutes are presently testing "algit" as a supplement to animal feeds. Meanwhile, it has been

**Norway (Contd.):**

approved for distribution through the State Farm Bureaus in Ohio and Pennsylvania (News of Norway, January 8, 1959.) \*

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**PURSE SEINERS USING MORE NYLON NETS IN WINTER HERRING FISHERY:**

During the 1959 winter herring fishery it is expected that 40 nylon purse seines will be employed. The first nylon purse seine to be used in Norwegian fisheries was in 1955. Last year 10-12 nylon seines were used, but the failing winter herring fishery hampered this development. Fishermen using nylon purse seines consider advantages to outweigh larger costs. The nylon purse seine is rot-proof, it doesn't have to be preserved, and since it is lighter the use of larger purse seines is possible.

In certain ways 1955 was an important year for the Norwegian fishing-gear industry. Nylon nets won through in the cod fishery and in other fisheries as well. And that year a new Norwegian fishing gear factory started production. This factory is the sole Norwegian specialized factory for nets with double knots. Nylon and synthetic fibres are now totally dominating the market. Practical and scientific tests have shown that double knots are also very strong and reliable. To fill the demand for purse seines with double knots requires an important part of the factory's capacity.

The one factory's yearly production totals some 40,000 nets of different types and sizes; 6 machines are employed, all of them designed for double knots. (Norwegian Fishing News, No. 3, 1958.)

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**SEINE FISHING IN THE LOFOTEN AREA PROHIBITED:**

The Norwegian Storting on December 11, 1958, passed a resolution requesting the prohibition of seine fishing in the Lofoten area (off the northwest coast of Norway) during 1959 and 1960. The Storting has been confronted with a Government proposal, which was not voted on, that seine fishing be permitted after

mid-March as in the past several years. The Lofoten fisheries are active in the late winter and early spring when migratory cod come into the fjords to spawn. The Government proposal was based on recommendations from experts in the Ministry of Fisheries. The vast majority of Lofoten fishermen, however, who customarily fish with lines and small nets, vigorously opposed seine fishing with the complaint that the seiners drove away the fish and were responsible for the poor catches. The Minister of fisheries, who was in disagreement with the views of his ministerial experts, spoke in favor of the two-year prohibition.

The prohibition against the use of seines is not expected to have any significant effect on the total Lofoten catch as such gear has in the past accounted for only a small proportion of the total. Also the ban will encourage additional fishermen to take part in the fishery. If good catches are brought in during the next two years, the prohibition may be extended. It is doubtful that the ban on seines will make it possible to determine definitively whether their use is harmful to the fish stocks. (United States Embassy in Oslo, report of December 19, 1958.)

**Panama****BAIT FISHING PERMITTED  
IN 1958/59 CLOSED SEASON:**

The Government of Panama, by Decree No. 116 of December 9, 1958, modified for the second consecutive year terms of Article 3, Decree No. 30 of December 22, 1952, and Article 1, Decree No. 148 of June 12, 1953, to permit bait fishing in territorial waters during the three months closed season. Decree No. 116 provided that deep-sea tuna vessels could fish for the anchoveta (*Centengraulis mysticetus*) in Panamanian territorial waters of the Pacific coast during the months of November and December 1958 and January 1959. Special fishing permits were required and were obtainable from the Ministry of Agriculture, Commerce and Industry at US\$4 a ton of the registered net tonnage of the tuna vessel.

**Panama (Contd.):**

This modification in existing bait fishing regulations was made on the basis of the determination of the Inter-American Tropical Tuna Commission that year-round fishing of anchoveta at the present level would not place the species in the Gulf of Panama in danger of depletion. Moreover, the Commission is to continue its studies of the Panamanian anchoveta and will be in a position to observe the effect of year-round fishing (United States Embassy dispatch from Panama, January 8, 1959.)

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**DECREE EXTENDS TERRITORIAL WATERS TO 12 MILES:**

The President of Panama signed on December 17, 1958, a law extending Panama's territorial sea to 12 miles.

It is the view of the United States Government that no basis exists in international law for claims to a territorial sea in excess of three nautical miles from the baseline, which is normally the low-water mark on the coast. Furthermore, in the United States view there is no obligation on the part of states adhering to the three-mile rule to recognize claims on the part of other states to a greater breadth of territorial sea.

Insofar as the Panama Canal is concerned, it is clear from the 1903 Treaty that rights of the United States thereunder cannot be affected by changes in the laws of the Republic of Panama.

Panama's action would appear to be at variance with the understanding reached in the United Nations on December 10, 1958, when the General Assembly adopted a resolution calling for a second Law of the Sea Conference to be held in Geneva in March-April 1960. At that Conference the breadth of the territorial sea under international law will be considered. Panama was one of the 71 nations supporting the measure, according to a United States Department of State press release of December 18, 1958.

**Peru****HUNTING FOR SEA LIONS PROHIBITED:**

All hunting of sea lions in Peruvian waters, was suspended until January 1, 1962, by the Peruvian Government in Supreme Decree No. 11 of November 11, 1958.

The Government announced that the species is in danger of extinction. Violators of closed season will be subject to fines ranging between US\$8 and US\$2,000 and imprisonment of 30 to 50 days. Skins and items manufactured from sea lions taken in violation of this law will be confiscated. (United States Embassy, Lima, report of December 2, 1958.)

**Philippines****FISHERIES DEVELOPMENT AIDED BY INTENSE RESEARCH PROGRAM:**

An intense research program, based on 1 research station, 9 laboratories, and some 60 research workers, is helping to speed up and direct the development of the rich fisheries of the Philippines. This is the report of a well-known German fishery biologist who has just completed a two-year assignment in the Philippines on behalf of the Food and Agriculture Organization (FAO) Rome, Italy.

"I went to the Philippines to help the Government plan a program of research in marine fishery biology and to train Philippine workers to carry out this research," explained the biologist at an interview at FAO Headquarters early this year. "We have made considerable progress during the past two years," he continued. "We were able to set up a research station and nine laboratories, which are being equipped with the help of such organizations as the Colombo Plan, as well as by Project Development Funds from the Philippine Government. The Colombo Plan organization is supplying \$20,000 worth of equipment, and the Philippine Government is providing \$75,000 for financing the laboratories.

"I have also been able to train some sixty research workers and counterpart

**Philippines (Contd.):**

assistants who are already engaged on numerous research assignments in marine biology. All these workers are young men and women graduates from the University or from the Philippine Fisheries Technology Institute, and they are showing a great enthusiasm for the work. Eight of the more outstanding workers are being given training abroad, three by Colombo Plan fellowships, one by the International Cooperation Administration, one by a FAO fellowship, two by the German Government, and one by the Japanese Government."

The research program seeks to provide information on the biology of commercial species of fish in the Philippine waters. Studies are being made of the life history, habits, distribution, reproduction, rate of growth, and other biological factors of the fish. One of the difficulties faced in this program is the great variety of species of commercial fish found in the Philippine waters.

"The Philippines have rich resources," the biologist pointed out, "but there is no predominant species such as we know in the North Atlantic where a fishery can be based mainly on, say, herring, or some other predominant species. It is also a fact that not enough is known of the Philippine resources so that a great deal of research must be done."

A particularly important part of the work is to establish the productivity of a fishing area, especially in relation to gear and intensity of fishing effort.

This point has come to the fore recently because of the introduction of modern types of gear and equipment. Such new gear has led to considerable increases in catch and has given rise to fears by some of the fishermen, who still use the old methods, that the resources will be destroyed by overfishing. These fears are unfounded but with the changing and developing situation, there is no doubt that such problems will often recur.

There is a need now for a fleet of research ships, probably three, and there

are hopes that such vessels will be provided in the next 2 or 3 years.

The biologist will probably be called upon to return to the Philippines in about two years' time to check on the progress being made with the research program.

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**MARKET FOR CALIFORNIA-TYPE SARDINES:**

Canned fish, and especially sardines or pilchards, are a staple item in the Filipino diet, and, since they are consumed largely by the lower income groups, price is the significant determining factor in their sale. Since California sardines are generally priced above competing brands from other nations, this has seriously affected the sale of California sardines in the Philippines.

While of considerably less importance than price, other factors have contributed to the decline in California sardine sales to the Philippines. These include the recent shortage of California sardines, which has led local importers to turn to Japanese and South African brands, and the poor dollar position of the Philippines, which has encouraged private importers and the largest single importer to purchase inexpensive non-United States off-brands to conserve foreign exchange. A recently completed fish canning factory, which will can locally-caught sardines as well as other fish, will undoubtedly affect the Philippine market in the future.

The largest single importer of sardines into the Philippines sells its imports not only through its licensed retailers, but also imports for other distributors and wholesalers. The firm's prices generally are the lowest offered in Manila as it tries to give its retailers a preferred competitive position.

An informal survey of local retail outlets not serviced by the largest single importer gave comparative prices for both United States and Japanese packs of sardines. Table 1 shows the average retail price of several different brands within one pack-type.

Type	Philippine Retail Prices Early in 1959			
	United States		Japanese	
	Peso	U. S.¢ (per can)	Peso	U. S.¢
1-lb. ovals, tomato sauce	0.65	32.5	0.45	22.5
1-lb. tall, tomato sauce	0.45	22.5	0.40	20.0
1-lb. tall, natural	0.50	25.0	-	-
8-oz. oblong, tomato sauce	0.45	22.5	0.35	17.5
8-oz. buffet tomato sauce	0.45	22.5	0.35	17.5
5-oz. tomato sauce	0.25	12.5	0.20	10.0

A comparison of the prices of United States and Japanese sardines will largely explain why the Filipino housewife, who cannot purchase native fresh fish because it is too expensive, purchases the lower-priced Japanese and South African brands.

There is no question that if California sardines were competitive in price with those of Japan and South Africa they would continue to hold the largest share of the Philippine market. Filipinos prefer California sardines to those of other countries because they have a milder aroma and taste. However, only Filipinos of the relatively small middle class appear willing to pay the higher price for California sardines, and they also can afford fresh local fish, poultry, and meat.

Unless the price of California sardines is made competitive or Philippine living standards rise to the point where the difference of five centavos on a can of sardines is of no importance to the mass of consumers, the American share of the local canned sardine market will continue to decline. The doubling of tariffs on United States imports beginning January 1, 1959, is likely to accelerate this trend.

Prices of sardines taken from the Master Price List of August 14, 1958, and an Additional Price List of December 2,

### Philippines (Contd.):

1958, issued by the largest single importer in the Philippines show these prices:

1. 15-oz. tails in tomato sauce (48 cans per case): retail price per can ₱0.40 (20 U. S. cents); wholesale prices, Japan (4 brands) ₱16.40-16.90 (US\$8.20-8.45) a case, South Africa (4 brands), ₱16.30-17.60 (\$8.15-8.80) a case.

2. 15-oz. tails, natural (48 cans per case): retail price per can ₱0.35 (17.5 cents); wholesale price, South Africa (3 brands) ₱15.15-15.30 (\$7.58-7.75) a case.

3. 5-oz. tails in tomato sauce (100 cans per case): Japan (5 brands), wholesale price ₱16.50-16.90 (\$8.25-8.45) a case, retail price 10 cents a can; South Africa (3 brands), wholesale price ₱15.38-15.40 (\$7.68-7.70) a case, retail price 2 cans for 17.5 cents.

4. 15-oz. ovals in tomato sauce (48 cans per case): Japan (13 brands), wholesale price ₱16.00-18.70 (\$8.00-8.35) a case, retail price 19-22.5 cents a can; United States, one brand's wholesale price at ₱16.00 (\$8.00) a case and retail price 2 cans for 37.5 cents, and another brand's wholesale price ₱19.00 (\$9.50) a case, retail price 22.5 cents a can.

5. 15-oz. buffet in tomato sauce (48 cans per case): retail price per can ₱0.25 (12.5 cents), South Africa (2 brands) wholesale price ₱10.30-10.50 (US\$5.15-5.25) a case.

6. 8-oz. buffet in tomato sauce (48 cans per case): retail price per can ₱0.25 (12.5 cents), Japan (1 brand) wholesale price ₱10.15 (\$5.08) a case.

7. 4-1/2-oz. in tomato sauce and olive oil (100 cans per case): Portuguese (8 brands), wholesale price ₱23.30-25.10 (\$11.65-12.55) a case, retail price 12.5-15 cents a can.



### Spain

#### CALIFORNIA-TYPE TUNA CLIPPER STARTS WINTER SEASON WITH GOOD TRIP:

The new Spanish California-type tuna clipper Marinero during the first trip of the 1958/59 winter season in the waters off Dakar is reported to have caught 274 metric tons of tuna.

The Spanish Basque fleet working Dakar waters hopes that the Marinero's success also promises them a good winter fishing season.

The good catch is helping reverse the low esteem held for those vessels by Spanish commercial interests and government officials, arising from the unsuccessful operations of the Marinero during the 1957 season and by the sinking of its sister ship the Marchoso. Both ships were built in Spanish shipyards. (United States Consulate, Vigo, report of December 24, 1958.)

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### COD FISHERY TRENDS:

A large Spanish cod company, which operates 16 large vessels with a combined tonnage of 27,000 tons, reports that the scarcity of cod in the Northeast Atlantic continued during 1958. In the opinion of the local representative of the Union of Iceland Fish Producers, who recently returned from a visit to Iceland, the reason why the cod are disappearing off Iceland and Newfoundland is the changes in climatic conditions and in the prevailing currents. In the near future Spanish cod fishermen may have to go to the Bear Islands, off Northwest Norway, to fish for cod.

Although imports of cod by Spain are not yet available for 1958, it is believed that somewhat below the normal 20,000 metric tons were imported for the year. The Spanish catches, which are brought in by 15 companies operating 36 ships, account for additional receipts of 50,000 tons a year. It appears, however, that within the next 3 years or so Spain will be able to supply all of its own needs, because of the many trawlers which are being built and added to the cod-fishing industry. At that time, as reported by the Icelandic representative, Iceland will no longer purchase any fruits, wines, liquors, and cognac from Spain, which pays for its imported cod from that country with these products (United States Consul in Bilbao, January 5, 1959).

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#### CANNED FISHERY PRODUCTS EXPORTS, 1957:

Exports of canned fishery products comprise a large part of Spain's foreign

Spanish Canned Fishery Products Exports, 1925-1957			
Year	Quantity	Total Value	
	Metric Tons	1,000 Pesetas	US\$
1957 . . . . .	12,720	28,747	9,392
1956 . . . . .	12,511	29,080	9,500
1955 . . . . .	9,685	21,280	6,952
1954 . . . . .	5,583	18,750	6,126
1953 . . . . .	8,871	16,275	5,317
1952 . . . . .	9,093	18,762	6,130
1951 . . . . .	9,935	22,331	7,296
1941-50 avg.	2,908	4,935	1,612
1925-34 "	5,542	18,530	6,054

Note: Values converted at rate of 1 gold peseta equals US\$0.3267

## Spain (Contd.):

trade. In 1957, the quantity of exports increased over 1956 but the value decreased. Table 1 shows the trends in canned fishery products exports since 1925.

Spain's recent trade agreements with various countries--among them Poland, Hungary, and Czechoslovakia--have opened new horizons for exports of canned fishery products. Spain's traditional markets have been Cuba, Germany, Egypt, and others.

In a recent annual report issued by one of Spain's principal canneries, there are some interesting comments on exports, especially in regard to canned anchovies, which explain the drop in value of 1957 exports.

In order to compete with Portugal and Yugoslavia in the marketing of canned anchovies, Spain has had to cut prices to keep exports at a high level so that imports of tin plate--essential in the manufacture of cans--could be continued. This situation resulted when anchovy-salting firms of Cantabrico found that they could not sell their product to Italian canneries. Finding themselves with large stocks of anchovies, which have a short storage life, they had to sell their product quickly at sacrifice prices.

Canned anchovies continue to be the principal fishery product exported by Spain. Exports are made principally to Cuba, followed by Germany, Egypt, the United States, Finland, Switzerland, France, Poland, and to a lesser extent, Belgium and a few South American countries.

The situation which has occurred with canned anchovy prices has also occurred to a smaller extent with prices of canned bonito and sardines. The competition from Portugal and Morocco has been intense. Spanish firms have had to sell at profit-sacrificing prices in order to prevent the loss of foreign markets. The foreign markets are essential not only as a means of selling the canned goods but also as a means of obtaining the necessary import quotas for tin plate. (Industria Conservera, Vigo, Spain, September 1958.)

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FISH SHIPPED BY AIR  
BETWEEN CANARY ISLANDS:

During the latter part of 1958 air shipments of fresh fish were made from the Canary Island coast of Lanzarote to the neighboring island of Tenerife. Thus, fish caught in the morning off one island were sold that afternoon on the other island.

The shipments were in lots of 20 kilos (44 pounds) in ice-covered baskets. By this method, 1,200 kilos (2,645 pounds) of fish (mostly parrotfish, grouper, and sea bass) were shipped. Shipments were limited by the space available for air transport.

As gifts, a sea bass weighing 8 kilos (about 18 pounds) was sent to Madrid, and another weighing 10 kilos (22 pounds) was sent to Bata, Guinea. These fish arrived at their destination in perfect condition. (Industrias Pesqueras, Vigo, Spain, October 1958.)

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NEW FISHERIES LABORATORY IN  
BARCELONA UNDER CONSTRUCTION:

Scheduled for completion in the summer of 1959 is the combined fisheries laboratory and aquarium being built by the Superior Council of Scientific Investigations in Barcelona. The new building will serve as the main office for Spanish fisheries studies. Branch offices will be located in Cadiz and Vigo. The three-story and basement building will have machinery, two water pumps, an air filter, and a refrigerator for fish food in the basement. The ground floor will have four large rooms with glass aquarium tanks for displaying live fish. The largest tank will have a capacity of 90 cubic meters for larger specimens. In addition, a small museum of plastic reproductions and drawings will be on that floor. The second floor will contain the research laboratories, a freezer to maintain a temperature of  $-10^{\circ}$  centigrade ( $14^{\circ}$  F.), a vacuum chamber, room for photographic work, and a one-ton floating cement block to support weighing scales. The rest of the new building may be used for quarters for personnel and will have space for a 200-ton water tank.

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Spain (Contd.):

**REHABILITATION OF SHELL-FISH RESOURCES PLANNED:**

The shellfish division of the Spanish National Fisheries Syndicate is developing a long needed plan for the conservation, artificial breeding, and exploitation of shellfish species along the Spanish coast. Spurring development of the plan are declining harvests, the subeconomic position of coastal fishermen, increased competition from the French, and particularly, the very successful results in the past 20 years with artificial breeding of mussels.

The study committee which met in the latter part of November 1958, pinpointed the problems which must be met to make the "Plan Galicia" (so-called because efforts will first be concentrated in north-eastern waters) a reality. These problems are: a licensing plan to limit the number of harvesters and their area of work; the overhauling of antiquated systems of harvesting which are exhausting most species (particularly grooved carpet shells and common cockles); the development of new oyster beds (present beds being too concentrated and over-worked); the artificial cultivation of other species now wholly limited to mussels; and the strict enforcement of off-season prohibitions on the harvesting of shellfish.

Mussel production rose from 400 tons (weight in the shell) in the early 1940's to an estimated 5,500 metric tons in 1958. Shellfish production in 1957 was 52,242 metric tons, valued at US\$14 million. (United States Consulate, Vigo, report of December 24, 1958.)

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**TUNA FISHING VESSELS OPERATING OFF DAKAR AGAIN IN 1958/59:**

A fleet of eight tuna fishing vessels left the Spanish fishing port of Bermeo at the end of October 1958 to fish off Dakar, West Africa, until about March 15, 1959.

The tuna vessels are under contract to a group of fish canners in the Canary Islands, the contract calling for a mini-

mum quota of tuna to be paid for at about 8.6 U. S. cents a pound, or US\$173 a short ton, for the eviscerated fish. The canners make available to the fleet several small transport vessels which pick up the tuna from the fleet while on the high seas and return to the Canary Islands where the catch is weighed and turned over to the canners. A round trip from the Canary Islands to the fishing zone requires 9 to 10 days. On these trips the small transports haul all the food, water, and other needs of the fishermen. While fuel-oil and ice are obtainable closer at hand both in Dakar and Port Etienne in French West Africa, they are priced so high that it is cheaper to ship them from the Canary Islands.

Each fishing vessel (average about 75 tons) has a crew of 17 men, making a total of 119 for the fleet. The crew includes a Franciscan priest and a lay brother of the same order serving as simple seaman and mechanic respectively. The crew members undergo privations in the tropical waters, since there is a shortage of space, inadequate food and water, and little comfort for them. Space priority is given to the fuel tanks, refrigerated storage holds for tuna, and the live bait tanks.

Because of the difficulties which the fishermen and the fishing fleet as a commercial enterprise have to undergo, only one ship, of all those which have gone since the fishery began in 1956, has returned to fish again off Dakar. The answer as to why the Bermeo fishermen set forth toward West Africa annually is to be found in the extraordinary abundance of tuna there, as compared to the scarcity of fish of any kind in the winter season in the Bay of Biscay. Although the Bermeans have sought other fishing areas, especially in the Mediterranean, they have found the tuna fishery off Dakar to be the most productive. The tuna in this area is the *Neothunnus albacora*, known as the rabil in Spanish, the yellowfin in English, and the thon aux nageoires jaunes in French.

In 1956 eight ships set out for French West Africa and fished for tuna about 100 miles south of Dakar. They departed from Bermeo early in November 1956 with a crew of 125 men and returned home

**Spain (Contd.):**

at the end of January 1957. In a period of 50 fishing days, they caught about 600 tons of tuna valued at 4 million pesetas (US\$95,238 at official rate of exchange), averaging about US\$11,900 per vessel. The rest of the Bermeo fishing fleet of 170 vessels that remained in its home waters caught during the same period about 2,400 tons of fish valued at 12 million pesetas (US\$285,714), or about US\$1,680 per vessel.

According to the Secretary of the Brotherhood of Fishermen in Bermeo, the catches in the African waters could easily be doubled under more favorable conditions. One of the most important of these conditions would be the use of one or more refrigerated ships which would remain in the fishing zone and then proceed when loaded either to the Canary Islands or, better still, to the canneries at Cadiz, Huelva, Vigo or Bermeo where much higher prices could be obtained for the fish. So far, the several attempts to purchase refrigeration ships from French and Italian sources have not proven successful, the United States Consul at Bilbao reported on January 5, 1959.

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**VIGO FISHERIES TRENDS,  
NOVEMBER 1958**

**Fish Exchange:** Landings of fish and shellfish in November 1958 at the Vigo Fish Exchange amounted to 9,015 metric tons, a drop of 144 tons from the preceding month, but exceeded November 1957 landings by 2,423 tons. The November 1958 landings set a new record for that month. Major species sold over the exchange in November 1958 were: sardines, 2,690 tons; anchovies, 2,215 tons; horse mackerel, 933 tons; small hake, 637 tons; and needlefish, 393 tons.

The November 1958 landings were valued at US\$1,565,800 (US\$1.00=42 pesetas), an increase in value over October of US\$153,000 and close to US\$440,000 above the value for November 1957.

**Fish Canning and Processing:** Cannery activity was above normal for November 1958 with 2,635 tons of fresh fish

processed as compared with 934 tons in the same month of 1957. The good November 1958 landings also helped the smoking, drying, and pickling processors, who purchased 2,077 tons, about 1,095 tons above the October purchases. Shipments to interior fresh fish markets dropped about 10 percent from the 5,000 tons shipped in October due to the good demand from the Vigo processors.

**Sardine Fishing Season:** The closed season for sardine fishing, initiated as a conservation measure, has been extended 15 days and now extends from February 15 to April 30. Some disagreement exists on the dates for the closed season on the part of industry members. Some claim that the closed season would be more beneficial from a conservation standpoint if it were established earlier in the year when the sardines spawn. (United States Consulate, Vigo, dispatch, December 24, 1958.)

**Sweden****HERRING CATCH FOR 1958  
OFF ICELAND FAIR:**

The Swedish 1958 drift-net herring fishery in Iceland waters yielded 22,930 barrels or about 2,200 metric tons of salted herring with a sales value of US\$521,000, according to a report made by the Bohuslans Icelandic Fishermen's Association in Lysekil. The catch was taken by 29 vessels. The Association had contracted for 27,545 barrels and they were able to fulfill about 83 percent of that amount. In 1957, 20 vessels caught about 1,500 metric tons of herring.

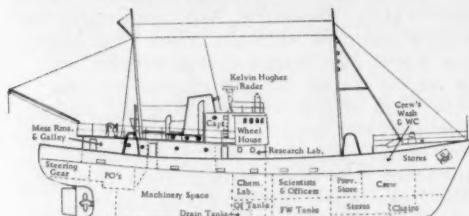
A purse-seining expedition consisting of a mothership and one fishing vessel participated in the Icelandic herring fishery and caught only 580 barrels. This expedition had contracted for 2,000 barrels, the United States Consul at Göteborg reported on November 21, 1958.



## Union of South Africa

**NEW SARDINE RESEARCH VESSEL:** A new 120-foot steel research vessel, the *Sardinops*, has been built by the South African Government to take part in an expanded research program on the sardine and maasbanker (jack mackerel) fisheries. The vessel's principal dimensions are: length over-all 120 feet; breadth, moulded 25 feet; draught, loaded 10 feet; tonnage 342 gross. Both hull and upper works are of all-welded steel construction.

The main propulsion engine is a 600/660 b.h.p. 5-cylinder two-stroke marine Diesel, type 495 V.O., operating at 130 r.p.m., and giving a speed



of 10 knots. It is hydraulically coupled to the propeller, which can be operated by finger-tip control from the bridge. Auxiliaries include two 55 k.w. Diesel generator sets, and a Diesel engine driving compressor service pump, and stand-by generator.

The trawl winch is mounted fore-and-aft, and like the hydrograph winch, windlass, and line hauler, is hydraulically operated. The vessel is fitted for starboard side trawling, the port side being fitted with towing booms for plankton nets, etc. Fish holds are fitted on the well deck.

Steering machinery consists of hand and powered hydraulic gear, and no active rudder is fitted. Navigational equipment includes gyro compass, log, deep-water and shallow-water echo sounders, radar, and other equipment.

Accommodation comprises the captain's cabin on the bridge deck, 4 roomy double-berth cabins for officers and scientists, and cabins and berths for 4 petty officers and 6 seamen.

The biological laboratory, 13 feet 6 in. by 9 ft. 6 in., is housed on the main deck, and contains 3 stainless steel sinks, a gimballed table, and has acid resisting flooring. Fresh and salt water, compressed air, and electric power are also included. A similarly-equipped, though smaller chemical laboratory is provided on the deck below.

A feature of the vessel is the absence of a fish-room, due no doubt, to the nature of the fishery on which work is to be carried out. There is cold storage, however, which could conceivably be utilized for the storage of fish samples.

Another feature is the use of 16-ft. glass fibre lifeboats, two of which are slung in davits.

Two 70-ft. wooden research ships, the *Trachurus* and the *Kunene* have also been launched, and will

be engaged on the same research program. (World Fishing, January 1959.)



## United Kingdom

### EXPERIMENTS TO EXTEND THE LIFE OF SALMON:

The normal life cycle of salmon is to be born, go to sea, return after two or more years to the upper parts of streams and rivers, spawn, and die. A few salmon have been known to return to the sea after spawning, and return and spawn two, three, or four times.

Scientists of the Lancashire River Board wondered if this mass death of salmon returning to sea was needless, if in fact deaths resulted only from sheer exhaustion and starvation. They pointed out that once the salmon enters fresh water it stops eating. While fighting upstream, spawning and fighting back to the sea, the fish lives off its own body. This period usually lasts several months.

As an experiment, the Board sent men with nets through the upper reaches of England's spawning rivers as the salmon arrived in the fall of 1958. They caught 230 salmon, both male and female, put them in tank trucks and hauled them to a hatchery. There the eggs were stripped from the females, artificially fertilized by the males, and put into cool freshwater tanks for 100 days to hatch.

The adult fish were then put back into the tank trucks and hauled to the seaside at Morecambe. There they were put into fresh-water tanks but seawater was admitted gradually in small doses until after five days the water matched that of the open sea.

Then the fish were transferred to the open air wading pool on the beach and offered their normal sea diet, crustacea, eels, and herring. Most started eating almost at once. New ovaries began to develop in some of the females.

The fish early in December 1958 were being tagged and given a few more days to recuperate. Then they were to be put into tanks and carried five miles or so

offshore and turned loose. Experts hope many will come back next year.

So far the experts are satisfied since few fish have died.

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#### FIRST TRANSOM STERN TRAWLER BUILT:

A new trawler has been built with a transom stern in Great Britain. The decision to adopt this hull form was taken after considerable research and tank tests carried out on models. These tests



A new trawler built in Great Britain with a transom stern

indicated that such a hull would be faster than one having the conventional cruiser stern, and would be a good sea-ship under adverse weather conditions.

Some of these claims have already been justified, for the new motor vessel Kelvin has run trials on the Humber. She is now in service with a large British fishery firm.

The Kelvin has the following dimensions: length between perpendiculars 137 ft. 6 in.; breadth, moulded 28 ft.; depth, moulded 14 ft. 3 in.; gross tonnage 448.

The vessel is powered by a triple-expansion steam engine, of 750 indicated horsepower and has an oil-fired boiler. Also steam-driven, is the main 15-kilowatt generator; the 10-kilowatt stand-by set is powered by a Diesel engine.

The new stern affords more spacious accommodation and washing facilities aft. The fish hold of 8,650 cubic feet is insulated, and employs aluminum alloy for the wing bulkheads and fixed shelf angles.

Life-saving appliances consist of three inflatable dinghies, of over 150 percent crew capacity, and an 18-foot wooden work lifeboat launched by a center line davit.

Steam provides the power for the hydraulic steering system, and also for the trawl winch, which has a capacity of 1,200 fathoms of 2 $\frac{1}{2}$ -inch trawl warp.

Initial trials of the Kelvin, believed to be the first trawler with a transom stern, were highly satisfactory. A speed of 12 knots was recorded. (November 1958 World Fishing).

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#### GOVERNMENT PLANS AID TO PILCHARD INDUSTRY:

Larger multipurpose craft, capable of year-round fishing for other markets besides pilchards, are recommended in a plan drafted by the British White Fish Authority for consideration by the industry. At present about 6,000 metric tons of pilchards are landed in Great Britain per annum, and 12,000 tons of pilchards are imported. Yet there are resources of 800,000 tons in the English Channel.

The pilchard industry of Cornwall is marginally profitable and depends largely on the subsidy for survival. There are indications that it is beginning to recede. At an average annual production level of 6,000 tons, it is worth about £200,000 (US\$560,000) per annum to the national income. As of August 1, 1958, the Authority had invested £86,800 (US\$243,000) in the production phase of industry, of which £30,000 (US\$84,000) was by way of grant and £56,800 (US\$159,000) by way of loans. The industry pays £2,000 (US\$5,600) a year levy and receives £32,000 (US\$89,600) a year subsidy. Virtually all craft which land pilchards fish for other species as a sideline.

An important factor in the industry now being in its present position is the competition of imported canned pilchards. The total production annually of wet pilchards by the major competing countries of South Africa, South-West Africa, Japan, Portugal, and the United States is about 500,000 tons and is rising. This background

**United Kingdom (Contd.):**

indicates the measure of competition faced by the English cannery industry which only has 6,000 tons of raw material a year.

The industry reached its present position during the postwar decade. There has been a transition from the curing to the canning of pilchards which has progressed almost to completion. The change has not been planned. The canneries which developed during the time of the sellers' market of 1947-50 are dispersed and their plants are but partly employed. The small pack is marketed separately by each of them. There are a total of seven factories concerned, five of which have the major interest, the other two being general food packers in Plymouth who take pilchards as occasion permits or demands. Of the first five, three are in Cornwall and depend mainly on pilchards for their production.

The other two are at Chichester and Yarmouth and have a more varied production. The total product is about 2,700 tons annually from the seven factories. The total normal daily capacity of the five is 112 tons of wet fish and they could, therefore, in theory, handle the total annual landings in 53 days. The pilchard is, however, a markedly seasonal fish; only a side stream of the main resource is exploited and the factories are in consequence faced with irregular supplies.

The United Kingdom imports approximately 12,000 tons of canned pilchards a year representing approximately 19,000 tons of wet fish. Therefore the total market for canned pilchards in the United Kingdom represents an approximate total wet landing figure of 25,000 tons annually. The scientists advise that there are resources in the English Channel of about 800,000 tons; therefore, the raw material to satisfy the United Kingdom market in canned pilchards by local production exists near at hand.

The production phase of the industry is made up of fishing units with traditional-type craft, using traditional gear in the traditional seasons and areas. They are out of date and out of context in the present ec-

onomy of the pilchard industry in competing countries in other parts of the world and find it extremely difficult to operate at the prices offered by the canners. In order to produce fish at a lower price, i.e.: to operate economic craft and gear, there are two alternatives:

(a) The employment of small craft of between 25 ft. and 30 ft. in length, which have low running costs and require only two men as the full crew, thus making a relatively low demand in wages or earnings.

(b) The employment of larger craft 70 ft. in length designed to operate gear, new to Cornwall, as the behavior of the fish demands according to seasons (i.e. midwater trawl; encircling nets--purse seine, lampara), as well as drift nets. The intention would be to land fish in such quantities and more regularly than hitherto so that not only may the costs of running the larger craft be met but that the price of fish at landing may be much reduced, and also to exploit alternative resources as a planned objective and not as side lines.

With regard to the first alternative, it has been shown that the presently-exploited resources which migrate along the Cornish coast are but a "side stream" of the main stock. Small craft could only continue to exploit this resource since they would not be sufficiently seaworthy to exploit the main stock offshore. While they would operate at low cost they would perpetuate the condition of erratic supplies, thus continuing the extant unsatisfactory supply position to the canners. Therefore all the indications are that a break with tradition is called for and that approach to the second alternative be examined. The seasonal nature of the supplies of pilchards may be relieved, but pilchards cannot be made available for canning throughout the year. Alternative marine resources are known to exist, and these should be sought and caught in order that the craft may operate profitably for the greater part of the year. The processing plant should be geared to receive these alternative products to keep plant and labor employed as fully as possible.

There would appear to be no short-term remedies available which would embrace all facets of the problem.

## United Kingdom (Contd.):

There is a market in the United Kingdom, at the right price, for canned pilchards equivalent to 25,000 tons of wet pilchards a year. For instance, at half the present landed cost this would mean increasing the contribution of the pilchard industry to the national income from £200,000 to £400,000 (US\$1.1 million) a year. With other marine products and byproducts this figure may well be doubled.

The recommendations of the Authority are:

1. That a pilot project be started in the form of a development unit based on one multipurpose craft, with new nets and gear, for two years, to explore the resources and potential costs and earnings of the probable future type of craft required. In order to design this unit, a small management committee should be established, first to plan and subsequently to operate the experimental unit.

The operations of the unit should be under the direct supervision of a technical officer.

2. When the production potential and operational costs of a new type of craft and gear have been ascertained, it will then be possible to indicate to the processors the potential of raw materials for which they would have to plan. The White Fish Authority would take up this aspect as and when the data from the experimental unit becomes available. It is stressed that a decision as to whether to put these recommendations into effect will be taken only after the views of the industry have been ascertained. (World Fishing, January 1959.)

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MARKETS DOGFISH SUCCESSFULLY:

Large numbers of "flake" or dogfish were being caught in the West Cornish waters off Great Britain during early December 1958. This was usual at that time of the year. A small number of long-liners were making quite heavy landings of those fish at Newlyn. Over 14,000 pounds were sold in one day.

Since the London market for Fleetwood dogfish was developed in recent years, a renewed interest has turned to "flake." "Flake" are mostly the common lesser spotted dogfish that take the bait from winter lines set for cod and whiting. The British report that a lot is known about the anatomy, breeding, and mating, but very little about the travels of dogfish. (The Fishing News, a British fishery periodical, December 12, 1958.)

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RENEWAL OF NEGOTIATIONS ON ICELAND'S FISHING LIMITS EXTENSION TO 12 MILES PROPOSED:

An offer to renew negotiations with Iceland to end the fishing limits dispute was made by the British Government in a Memorandum submitted to the General Assembly of the United Nations late in 1958.

Entitled "The Problem of the Fisheries around Iceland," it examines the justifications for unilateral action advanced by the Icelandic Government in its own Memorandum.

Taking first the economic aspect, or Iceland's need for fish, the British Memorandum first deals with the argument that Iceland had no alternative but to impose a 12-mile limit. It gives figures to show that the total catches by Icelandic fleets around Iceland have increased from an average of 328 million pounds in the years just previous to the war to 864 million pounds in 1956, the last year for which figures are available.

Moreover, Icelandic catches in other waters, such as Greenland, have increased from almost nothing before the war to 11 million pounds in 1956.

The herring fishery is admitted to be erratic, fluctuating between 66 million and 220 million pounds in recent years, but the Icelanders have it largely to themselves. And, apart from the herring, the Icelandic catch is seen to have increased almost threefold over the past 20 years.

It is evident, the British Memorandum says, that there is no sort of critical situation in the fisheries, nor apparently, any check to their continuing growth.

On the scientific aspect--overfishing and conservation--it is pointed out that the over-all catch of demersal species has greatly increased over the past two decades. The argument that the catch per fishing unit is falling is not tenable unless it can be shown that the over-all catch is decreasing and maintains a significant downward trend, for when a vessel exploits a previously unfished stock its catch will naturally be higher than when it is joined later by other vessels.

Another factor is that the year-classes vary greatly in numbers, and when a good year-class enters a fishery, the catch may increase markedly for several years; and as that class passes out of the fishery the total catch may fall until another good year-class comes along.

Short-term movements in catch totals and catch per unit may well be due to this influence, the Memorandum points out. (The Fishing News, December 5, 1958.)

**Venezuela**PEARL FISHING GROUNDS OPENED:

The opening of pearl-fishing grounds in the maritime zone (bounded by 63° 40'

## Venezuela (Contd.):

and  $64^{\circ}30'$  west longitude and  $11^{\circ}15'$  north latitude on the north and south to the mainland) was announced by the Venezuelan Ministry of Agriculture and Husbandry on December 9, 1958 (Gaceta Oficial No. 25833). Pearl fishing in that area will be permitted from January 1-April 30, 1959.

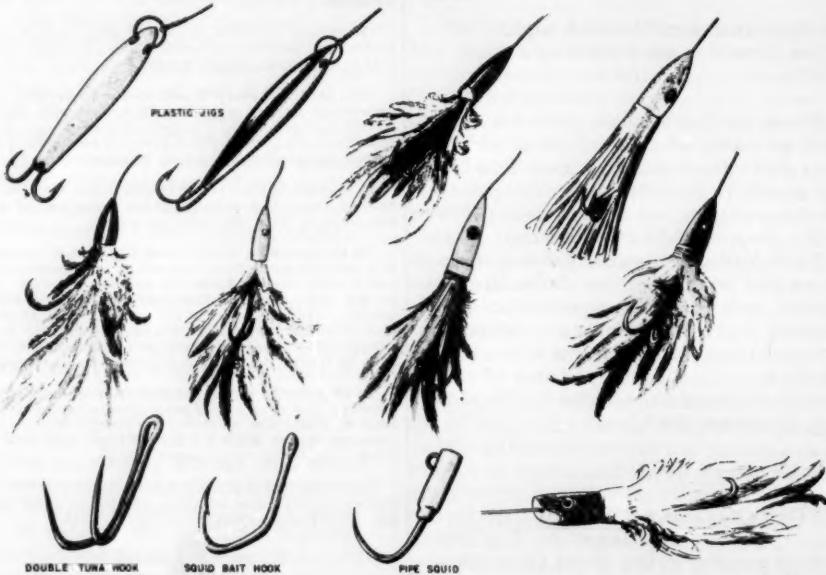
Another resolution of December 9, 1958, establish fees for several types of permits needed to engage in pearl fishing. These are: fully equipped diver, US\$30; drag or team of two drags, US\$3; and diver using aqualung or similar equipment, US\$3. (United States Embassy in Caracas, December 12, 1958.)



## WEST COAST ALBACORE TROLLERS

In the United States Pacific coast tuna fisheries, the albacore troller is third in importance. The clipper is first and the purse seiner is second.

In the albacore troller fishery lures on lines of varying length are trolled astern from two trolling poles. Three or four lines are attached to each pole and so rigged that they can be pulled in separately. These boats are usually about 60 feet in length.

TUNA JIGS

Halibut boats and salmon trollers frequently enter the albacore fishery, and during a good run almost anything that floats may be seen on the grounds. In some years well over 2,000 different boats have made albacore deliveries in Southern California.

# FEDERAL ACTIONS

## Federal Trade Commission

### CONSENT ORDER REQUIRES SEATTLE CANNED SALMON DISTRIBUTOR TO STOP PAYING ILLEGAL DISCOUNTS IN LIEU OF BROKERAGE:

The Federal Trade Commission January 12, 1959, approved a consent order (7209 Seafood) prohibiting a Seattle, Wash., canned salmon distributor from granting customers illegal discounts in lieu of brokerage.

The Commission adopted an initial decision by a hearing examiner containing an order agreed to by the company and the Commission's Bureau of Investigation.

A Commission complaint, issued July 23, 1958, had charged that the firm made a substantial number of sales direct to "at least one" large chain at a lower net price reflecting the 5-percent brokerage normally paid to brokers for negotiating the firm's sales. Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act prohibits paying or granting to buyers for their own account a discount or allowance in lieu of brokerage.

The Seattle firm, a distributor of canned salmon, is a wholly-owned subsidiary of a Canadian corporation located at Vancouver, the complaint stated. The order prohibits these illegal payments in the future.

The agreement is for settlement purposes only and does not constitute an admission by the company that it has violated the law.

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### CONSENT ORDER STOPS OREGON SEAFOOD FIRM FROM PAYING ILLEGAL BROKERAGE:

The Federal Trade Commission on January 7, 1959, approved a consent

order (7203 Canned Seafood) requiring an Astoria, Ore., seafood corporation and its officers to stop making illegal brokerage payments to favored buyers.

The Commission adopted an initial decision by one of its hearing examiners based on an order agreed to by the company and the Commission's Bureau of Litigation.

A Commission complaint, issued on July 22, 1958, had charged the firm with making direct sales to some buyers without utilizing brokers and giving price reductions approximating the brokerage fees which otherwise would have been paid.

The Commission also charged the firm with making some sales only through field brokers and reducing the selling price by the amount of the commissions which would have been earned by primary brokers.

The complaint had charged that these practices violate Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act. The order prohibits such practices in the future.

The agreement is for settlement purposes only and does not constitute an admission by the respondents that they have violated the law.

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### SEATTLE CANNED SEAFOODS BROKER ORDERED TO STOP PASSING ON BROKERAGE EARNINGS:

An Initial Decision (7151 Seafood) was issued on January 7, 1959, by a Federal Trade Commission hearing examiner which would require a Seattle, Wash., primary broker of seafood products to stop illegally passing on its brokerage earnings to customers. This is not a final decision of the Commission and

**Federal Trade Commission (Contd.):**

may be appealed, stayed, or docketed for review.

The examiner ruled that the firm, which is two partners, has granted direct and indirect price concessions, rebates, and allowances in lieu of brokerage. Holding these practices to be in violation of Sec. 2(c) of the Robinson-Patman Amendment to the Clayton Act, he ordered them stopped.

"The courts have consistently held that it is a violation of Sec. 2(c). . . to pay or to pass on brokerage to a buyer in any guise whatsoever," the examiner pointed out.

As alleged in the Commission's complaint of May 20, 1958, the examiner found the partners have made the unlawful payments by: (1) selling at net prices lower than those accounted for to their packer-principals, (2) granting price deductions through allowances or rebates, wholly or partly not charged back to the packers, and (3) taking reduced brokerage on sales involving price concessions.

For example, he said, the partners invoiced to a retail chain store 200 cartons of salmon at \$20.50 a carton but accounted for this sale to their packer principal at \$21.00, absorbing the 50 cents a case difference out of their brokerage.

Another invoice in the record covering 1,250 cans of salmon sold to a Detroit customer, continued the examiner, shows \$1,168.17 freight prepaid by the partners, while they actually paid "\$1,293.17, or \$125.00 more, which represents 10 cents a case promotional allowance granted to the purchaser in the form of a freight rebate."

The evidence further establishes that the Seattle firm had a contract with a buying subsidiary of a large retail chain store providing for a 50-cents-a-case lower price on all listed items, he said. On these sales, the firm received only 3 percent brokerage instead of the usual 5 percent, he added

**Department of Health,****Education, and Welfare****FOOD AND DRUG ADMINISTRATION****PETITION FILED FOR  
ESTABLISHMENT OF TOLERANCE  
FOR RESIDUES OF ANTIBIOTIC  
USED IN FISHERY PRODUCTS:**

A petition has been filed with the U.S. Food and Drug Administration by American Cyanamid Company, New York, N. Y., proposing the establishment of tolerances of 5 parts per million for residues of chlortetracycline (an antibiotic) in or on the following raw commodities: Fish (vertebrate) and any cuts therefrom, oysters (shucked), scallops (shucked), shrimp (peeled), shrimp (unpeeled), each in uncooked form.

The analytical method proposed in the petition for determining residues of chlortetracycline is that published in the Antibiotics Annual 1953-54, page 409, Medical Encyclopedia, New York, N. Y. The petition was reported in the January 6, 1959, Federal Register.

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**TIME EXTENDED FOR  
FILING COMMENTS ON  
FOOD ADDITIVES REGULATIONS:**

Requests have been received by the Food and Drug Administration for an extension of the time allowed for filing views and comments upon the proposal to establish definitions and procedural regulations governing food additives published in the Federal Register on December 9, 1958.

The Commissioner of Food and Drugs extended until February 7, 1959, the time for filing views and comments, according to the January 6, 1959, Federal Register.

Note: Also see Commercial Fisheries Review, January 1959, p. 73.



**Department of the Interior**

FISH AND WILDLIFE SERVICE

**FISHING VESSEL MORTGAGE  
INSURANCE PROPOSED  
RULE MAKING:**

Notice of Proposed Rule Making covering the procedures for fishing vessel mortgage insurance was signed by Interior Secretary Seaton and published in the January 23, Federal Register. Interested parties were allowed until February 23, 1959, to present suggestions or comments regarding the Regulations. Final Regulations will be issued after the suggestions and comments received have been evaluated.

The authority for the exercise of this function was transferred from the Maritime Administration to the Department of the Interior under the provisions of the Fish and Wildlife Act of 1956. The program will permit a mortgage given for the construction or reconstruction of a fishing vessel to be insured by the Department of the Interior. The mortgage cannot exceed 75 percent of the cost of construction or reconstruction and may bear interest of not to exceed 5 percent without any special findings, or 6 percent if the Secretary of the Interior finds that such interest rate is necessary, and may not have a maturity exceeding 15 years. The premium rate will be one percent on mortgages and 0.5 percent on construction loans.

**Interstate Commerce Commission****EXPRESS RATE INCREASE FOR  
JANUARY 1, 1959 SUSPENDED:**

On December 30, 1958, the Interstate Commerce Commission refused to permit the Railway Express Agency to increase its rates by  $3\frac{1}{2}$  percent effective January 1, 1959. This increase was protested by express users on the grounds that a 15-percent increase had recently been approved on express traffic generally. The Commission found that no increase was warranted on fishery traffic at that time.

The Commission ordered an investigation into the lawfulness of the proposed  $3\frac{1}{2}$ -percent increase and suspended the new rates until July 31, 1959. It is expected that hearings will be held on this latest proposal which has been identified as I. & S. Docket No. 7095.

**Office of Civil****and Defense Mobilization****REGULATIONS ISSUED FOR  
INVESTIGATIONS TO DETERMINE  
EFFECTS OF IMPORTS ON  
NATIONAL SECURITY:**

Section 8 of the Trade Agreements Extension Act of 1958 provides for investigations to determine the effects of imports on the national security. The Office of Civil and Defense Mobilization, which is responsible for the implementation and execution of Section 8, issued regulations on the conduct of such investigations. The regulations (OCDM Regulation 4), published in the January 15 Federal Register, provide that upon the request of the head of any Government Department or Agency, upon application of an interested party, or upon his own motion, the Director of the Office of Civil and Defense Mobilization shall set in motion an immediate investigation to determine the effects on the national security of imports of any article.

The regulations as printed in the Federal Register follow:

**Title 32A—NATIONAL DEFENSE,  
APPENDIX****Chapter I—Office of Civil and Defense  
Mobilization**  
[OCDM Reg. 4]**OCDM REG. 4—REGULATIONS UNDER  
SECTION 8 OF THE TRADE AGREEMENTS  
EXTENSION ACT OF 1958**

## Sec.

1. Authority.
2. Definitions.
3. General.
4. Criteria for determining effects of imports on national security.
5. Applications for investigation.
6. Confidential information.
7. Conduct of investigation.
8. Emergency action.
9. Report of Director.

### Civil Defense and Mobilization (Contd.):

**AUTHORITY:** Sections 1 to 9 issued under sec. 8, Pub. Law 85-686.

#### Section 1. Authority.

These regulations are promulgated pursuant to section 8 of the Trade Agreements Extension Act of 1958 (19 U.S.C., sec. 1352a), Pub. Law 85-686, August 20, 1958.

#### Sec. 2. Definitions.

(a) As used herein "Director" means the Director of the Office of Civil and Defense Mobilization.

#### Sec. 3. General.

(a) Upon request of the head of any Government Department or Agency, upon application of an interested party, or upon his own motion, the Director shall set in motion an immediate investigation to determine the effects on the national security of imports of any article.

#### Sec. 4. Criteria for determining effects of imports on national security.

(a) In determining the effect on the national security of imports of the article which is the subject of the investigation, the Director is required to take into consideration the following:

(1) Domestic production needed for projected national defense requirements including restoration and rehabilitation.

(2) The capacity of domestic industries to meet such projected requirements, including existing and anticipated availabilities of

(i) Human resources

(ii) Products

(iii) Raw materials

(iv) Production equipment and facilities

(v) Other supplies and services essential to the national defense.

(3) The requirement of growth of such industries and such supplies and services including the investment, exploration and development necessary to assure capacity to meet projected defense requirements.

(4) The effect which the quantities, availabilities, character and uses of imported goods have or will have on such industries and the capacity of the United States to meet national security requirements.

(5) The economic welfare of the Nation as it is related to our national security, including the impact of foreign competition on the economic welfare of individual domestic industries. In determining whether such impact may impair the national security, an substantial unemployment, decrease in revenues of government, loss of skills or investment, or other serious effects shall be considered.

The Director shall also consider whatever other factors relative to imports he deems appropriate in determining whether the national security is affected thereby.

#### Sec. 5. Applications for investigation.

(a) Applications in writing are required. Twenty-five copies shall be filed by mail with the Director, Office of Civil and Defense Mobilization, Washington 25, D.C.

(b) Applications shall set forth the reasons why it is believed that the quantities or circumstances of imports of the particular article threaten to impair the national security and shall contain the following information:

(1) Identification of the person, partnership, association, corporation, or other entity on whose behalf the application is filed.

(2) The name or precise description of the article.

(3) Description of the applicant and the domestic industry concerned, including pertinent information regarding companies and their plants, locations, capacity and current output of the domestic industry concerned with the article in question.

(4) Pertinent statistics showing the quantities and values of both imports and production in the United States.

(5) Nature, sources, and degree of the competition created by imports of the article in question.

(6) The effect, if any, of imports of the article in question upon the restoration of domestic production capacity in an emergency.

(c) When it is alleged that a threat of impairment of the national security would result from the impact of foreign competition on the economic welfare of the domestic industry, additional information of the following type should be provided concerning the applicant and the domestic industry:

(1) Employment and special skills required in the domestic production of the article.

(2) Extent to which investment and specialized productive capacity is or will be adversely affected.

(3) Revenues of Federal, State, or local Governments which are or may be affected by the volume or circumstances of imports of the article.

(4) Defense or defense supporting uses of the article including data on defense contracts or sub-contracts, both past and current.

(5) Direct capital investments for manufacturing facilities and developmental expenditures required to fulfill defense contracts or subcontracts; and direct capital outlays for exploration or expansion necessary to the growth and development of the industry for national defense purposes. In either case, the extent to which assistance was provided by Government-sponsored expansion programs.

(6) Statistics on production, sales, exports, profits, losses, prices, taxes, wages and other costs of production, subsidies, price support programs, inventories, plant investment and related data both for the applicant and the domestic industry whose production is in competition with the imported article, and the relationship of receipts of the applicant from sales of the article to applicant's total receipts.

(d) Statistical material should be presented on a calendar-year basis for sufficient periods of time to indicate trends and afford the greatest possible assistance to the Director. Monthly or

quarterly data for the latest complete years should be included as well as any other breakdowns which may be pertinent to show seasonal or short-term factors.

#### Sec. 6. Confidential information.

Information which would disclose individual business data or operations will be accorded confidential treatment by the Director if submitted in confidence. All information submitted in confidence should be on separate pages marked "Business Confidential."

#### Sec. 7. Conduct of investigation.

(a) The investigation by the Director, or by such official or agency as he may designate shall be such as to enable the Director to arrive at a fully informed opinion as to the effect on the national security of imports of the article in question.

(b) Upon receipt of an application for an investigation the Director shall issue a public notice which shall be published in the *FEDERAL REGISTER*. Any interested party shall notify the Director of his interest within thirty days, and submit to the Director twenty-five copies of any comment, opinion, or data relative to the investigation within forty-five days, after such notice. Rebuttal to material so submitted shall be filed with the Director within seventy-five days after such public notice and all data and comment from interested parties shall be a matter of record by ninety days after the giving of such public notice, or fifteen days after the close of any hearing conducted under paragraph (f) of this section.

(c) Any application for an investigation, as well as statements in opposition to the applicant's position, including nonconfidential supporting information, will be available for inspection at the Office of Civil and Defense Mobilization in Washington, D.C., where it may be read and copied by interested parties.

(d) The Director or his designee may also request further data from other sources through the use of questionnaires, correspondence and other available means.

(e) The Director or his designee shall in the course of the investigation seek information or advice from appropriate departments and agencies.

(f) In addition, the Director, or his designee, may, when he deems it appropriate, hold public hearings to elicit further information. In such cases the time and place of public hearings will be published in the *FEDERAL REGISTER*.

(1) All hearings shall be conducted by the Director, or his designee, and the full record shall be considered by the Director in arriving at his determination. Interested parties may appear at public hearings, either in person or by representation, and produce oral or written evidence relevant and material to the subject matter of the investigation.

(2) After a witness has offered evidence in testimony the Director or his designee may question the witness. Questions submitted to the Director or his designee in writing by any interested party may, at the discretion of the Director or his designee, be posed to the witness for reply for the purpose of as-

### Civil Defense and Mobilization (Contd.):

sisting the Director in obtaining the material facts with respect to the subject matter of the investigation. All hearings shall be stenographically reported. The Director, however, shall not cause transcripts of the record of such hearings to be distributed to the interested parties, but such transcripts may be inspected at the Office of the Director in Washington, D.C., or purchased from the reporter.

An applicant must file 25 copies of a request for an investigation by mail with the Director, Office of Civil and Defense Mobilization, Washington 25, D. C. The request must state the reasons for believing imports of an article threaten to impair the national security. It must also include descriptions of the article involved, of the domestic industry concerned, and of the nature, degree and source of the competition created by the imports in question. Supporting statistics on United States production and imports are also required.

Notice of the receipt of applications by OCDM will be published in the Federal Register. Interested persons must notify the OCDM Director within 30 days after the date of public notice of their interest and within 45 days after the public notice submit to him 25 copies of their comment or data. Rebuttal of material so submitted must be filed with

#### Sec. 8. Emergency action.

In emergency situations or at his discretion, the Director may dispense with the procedures as set forth above and may formulate his views without following such procedures.

#### Sec. 9. Report of Director.

A report will be made and published upon the disposition of each request, application or motion. Notice of publication of such report, shall be given in the FEDERAL REGISTER. Copies of the report will be made available at the Office of Civil and Defense Mobilization.

These regulations shall be effective upon publication in the FEDERAL REGISTER.

Dated: January 6, 1959.

LEO A. HOECH,  
Director.

the OCDM Director within 75 days of the public notice.

Copies of applications and the statements of interested persons, excepting confidential business information, will be available for public inspection through the OCDM Public Affairs Office in the Executive Office Building in Washington.

In some cases, the OCDM Director may hold public hearings to elicit further information. Should such hearings be held, notice of such hearings will be published in the Federal Register.

The regulations as published spell out the authority, the definitions, criteria for determining effects of imports on national security, applications for investigation, the handling of confidential information, the conduct of the investigation, emergency action, and the publication of a report on the disposition of each request, application, or motion. The regulations became effective upon publication.



### Department of State

#### UNITED STATES DELIVERS NOTE TO PANAMA ON 12-MILE TERRITORIAL SEA LAW:

The United States Ambassador to Panama delivered on January 9, 1959, a note to the Panamanian Government in which the United States stated its non-recognition of the provisions of the recently-enacted Panamanian law providing for a 12-mile territorial sea and reserved all of its rights in the area which is the subject of the law. The text of the United States note is as follows:

"Excellency:

"I have the honor to refer to your note No. 1096 dated December 23, 1958,

transmitting a copy of Republic of Panama Law No. 58 of December 18, 1958, which has as its purpose the extension of the territorial sea of the Republic of Panama to a distance of 12 miles from the coast.

"I have been instructed to state that the United States Government considers this action of the Republic of Panama is regrettable in view of the recent action of the United Nations General Assembly in voting overwhelmingly to call an international conference to consider the breadth of the territorial sea and fishery matters.

"It is the view of my Government, as expressed at the United Nations Law of

## Department of State (Contd.):

the Sea Conference and on previous occasions, that no basis exists in international law for claims to a territorial sea in excess of three nautical miles from the baseline which is normally the low water mark on the coast. Furthermore, in the United States view there is no obligation on the part of states adhering to the three-mile rule to recognize claims on the part of the other states to a greater breadth of territorial sea.

"My Government hopes that the Government of Panama will find it possible to reconsider its action and awaits the further consideration of the question of the breadth of the territorial sea by the international community. In the meantime the Government of the United States reserves all of its rights in the area which is the subject of Republic of Panama Law No. 58 of December 18, 1958.

"Accept, Excellency, the renewed assurances of my highest consideration."

The State Department stated in view of the many inquiries, that this new Panamanian law cannot affect the rights of the United States with respect to the Panama Canal. Article XXIV of the Convention of 1903 between the United States and Panama, relating to the Canal, provides:

"No change either in the Government or in the laws and treaties of the Republic of Panama shall, without the consent of the United States, affect any right of the United States under the present convention, or under any treaty stipulation between the two countries that now exists or may hereafter exist touching the subject matter of this convention."



## White House

ALASKA STATEHOOD PROCLAIMED:

President Eisenhower on January 3, 1959, signed the official proclamation making Alaska a state. Then, in a separate action, the President signed an executive order designating the design of

the new 49-star flag that will become the Nation's official ensign July 4.

\* \* \* \* \*

## NATIONAL OUTDOOR RECREATION RESOURCES REVIEW COMMISSION SET UP:

The appointment of seven conservationists to the National Outdoor Recreation Resources Review Commission (created by the 85th Congress) was announced by the President in October 1958. Appointed Chairman was Laurance Rockefeller, New York industrialist and conservationist. Joseph W. Penfold, conservation director of the Izaak Walton League of America, was also appointed, as were Samuel T. Dana, professor emeritus of forestry, University of Michigan; Mrs. Katherine Jackson Lee, Vice President and Director, American Forestry Association, New Hampshire; Bernard L. Orell, Vice President, Weyerhaeuser Timber Company, Washington; M. Frederick Smith, Vice President, Prudential Life Insurance Company, New Jersey; and Chester S. Wilson, former Commissioner of the Minnesota Conservation Department.

Four Senators and four Representatives selected by the House Speaker and the Vice President in July 1958 are: Senators Clinton P. Anderson, New Mexico, Frank A. Barrett, Wyoming, Richard L. Neuberger, Oregon, Arthur V. Watkins, Utah; Congressmen Gracie Pfost, Idaho, John J. Rhodes, Arizona, John P. Saylor, Pennsylvania, and Al Ullman, Oregon.

No commercial fishery representative was named to this Commission. Under the law there will now be established a 25-man Advisory Board representing public and private groups interested in outdoor recreation resources. The law specifically provides that the commercial fishing industry have representation on the Board.

The Commission is to inventory national recreational resources, project expected recreational usage into the years 1976 and 2000, and recommend means of meeting anticipated needs, reporting finally by September 1, 1961.

Note: Also see *Commercial Fisheries Review*, September 1958, p. 112.



## Eighty-Sixth Congress (First Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to



committees, pertinent legislative actions, hearings, and other actions by the House and Senate, as well as signature into law or other final disposition are covered.

FEDERAL BOATING ACT OF 1958 AMENDMENT: H. R. 3330 (McIntire), a bill to amend the Federal Boating Act of 1958; to the Committee on Merchant Marine and Fisheries; introduced in House January 26. Provides that all undocumented vessels now bearing valid numbers issued by the Coast Guard shall be exempt from the numbering provisions of subsection (d) section 3 of the said Act.

FISHERIES ASSISTANCE ACT: H. R. 3053 (O'Neill), a bill to provide a 5-year program of assistance to enable depressed segments of the fishing industry in the United States to regain a favorable economic status, and for other purposes; to the Committee on Merchant Marine and Fisheries; introduced in House January 21. Similar to H. R. 181 and other bills previously introduced.

FISHERIES COOPERATIVE MARKETING ACT AMENDMENT: H. R. 2777 (McCormack), a bill to amend the Fisheries Cooperative Marketing Act, introduced in House January 19; also H. R. 3348 (Pelly), introduced in House January 26; both to Committee on Merchant Marine and Fisheries. Similar to S. 23 and other bills previously introduced. The bill provides that fishermen's cooperatives shall not be subject to the provisions of the Antitrust Acts.

FISHERIES PRODUCTS INCLUDED IN FOOD-ALLOTMENT PROGRAM: S. 585 (Alken and 3 other Senators), a bill to safeguard the health, efficiency, and morale of the American people; to provide for improved nutrition through a more effective distribution of food supplies through a food allotment program; to assist in maintaining fair

prices and incomes to farmers by providing adequate outlets for agricultural products; to prevent burdening and obstructing channels of interstate commerce; to promote the full use of agricultural resources; and for other purposes; to the Committee on Agriculture and Forestry; introduced in Senate January 20. Provides for the inclusion of fish in the "basic food allotment" provisions of the program.

FROZEN FISH BITS TO BE CLASSIFIED UNDER FILLETS: S. 834 (Saltonstall and Kennedy), a bill to make certain frozen fish blocks classifiable under paragraph 717 of the Tariff Act of 1930; to the Committee on Finance; introduced in Senate February 2; also H. R. 3883 (Bates), to the Committee on Ways and Means, introduced in House February 2, similar to S. 834. The bill would add a new section to paragraph 717 of the Tariff Act of 1930 which would classify blocks of fish bits under the same category as fillets but at a flat duty rate of  $2\frac{1}{2}$  cents per pound. The new subdivision reads as follows: "(d) Fresh fish cut, sliced, ground, minced, or otherwise reduced in size, formed and frozen into blocks, slabs, sheets, or other bulk shapes, and suitable for processing in fish sticks, flakes, cakes, portions, or similar products of any size or shape, except fish provided for elsewhere in this paragraph or in paragraph 1756 of this Act,  $2\frac{1}{2}$  cents per pound."

HAWAII STATEHOOD: H. R. 2795 (Rivers of Alaska), a bill to provide for the admission of the Territory of Hawaii into the Union, introduced in the House January 19; also H. R. 3084 (Ullman) introduced in House January 21, H. R. 3304 (Hargis) introduced in House January 26, H. R. 3427 (Anderson of Montana) introduced in House January 27, and H. R. 3685 (Porter) introduced in House January 29; all to the Committee on Interior and Insular Affairs. Similar to H. R. 50 and other bills previously introduced.

IMPORTED COMMODITY LABELING: H. R. 2554 (Moore), a bill to amend the Tariff Act of 1930 with respect to the marking of imported articles and containers, introduced in the House January 15; also H. R. 3341 (Bailey), introduced in House January 27; both to Committee on Ways and Means. The proposed bill provides that imported articles removed from original container by the importer, or by a jobber, distributor, dealer, retailer, or other person, repacked, and offered for sale in the new package, shall be marked to show to the ultimate purchaser in the United States the English name of the country of origin of such article.

INCOME TAX LAW REVISION IN FAVOR OF FISHERMEN: S. 774 (Magnuson), a bill to extend to fishermen the same treatment accorded farmers in relation to estimated income tax; to Committee on Finance; introduced in Senate January 29. Similar to H. R. 604 and other bills previously introduced.

MEDICAL CARE FOR VESSEL PERSONNEL: S. 255 (Magnuson), a bill to provide medical care for certain persons engaged on board a vessel in the care, preservation, or navigation of such vessel; to the Committee on Interstate and Foreign Commerce; introduced in Senate January 14. Mere-

ly amends previous legislation by striking out "any person employed on board" and inserting instead "any person employed or engaged on board."

**PRESIDENT'S MESSAGE ON 1960 FEDERAL BUDGET:** The President's message on the 1960 Federal Budget had this to say specifically about fish and wildlife: . . . "Expenditures in 1960 for fish and wildlife resources will be about the present level. An increase is recommended to acquire lands for additional wildlife areas in 1960. Also, to aid the fishing industry, the fishery loan fund will be augmented by \$3 million and mortgages for fishing vessels will be insured by the Bureau of Commercial Fisheries in the Department of the Interior. . . ."

**PRICE DISCRIMINATION:** H. R. 1205 (Zablocki), a bill to reaffirm the national public policy and the purpose of Congress in the laws against unlawful restraints and monopolies, commonly designated "antitrust" laws, which among other things prohibit price discriminations; to aid in intelligent, fair, and effective administration and enforcement thereof; and to strengthen the Robinson-Patman Anti-Price Discrimination Act and the protection which it affords to independent business, the Congress hereby reaffirms that the purpose of the antitrust laws in prohibiting price discriminations is to secure equality of opportunity of all persons to compete in trade or business and to preserve competition where it exists, to restore it where it is destroyed, and to permit it to spring up in new fields; introduced in House January 7. Also S. 11 (Kefauver & 23 other Senators) introduced in Senate January 9, and H. R. 3654 (Johnson of Wisconsin) introduced in House January 29. All similar to H. R. 11. House and Senate bills to respective Committee on the Judiciary.

H. R. 2463, previously listed under Price Discrimination as similar to H. R. 11 was, following review of the bill, considered not pertinent to subject. Also H. R. 927 and S. 315 listed as similar to H. R. 11 deal with Price Discrimination Functional Discounts similar to H. R. 848.

**PRICE DISCRIMINATION FUNCTIONAL DISCOUNTS:** H. R. 848 (Montoya), a bill to reaffirm the national public policy and the purposes of Congress in enacting the Robinson-Patman Antiprice Discrimination Act entitled "An Act to amend section 2 of the Act entitled 'An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' and to clarify the intent and meaning of the aforesaid law by providing for the mandatory nature of functional discounts under certain circumstances; also H. R. 927 (Rogers of Colorado), introduced in House January 7; S. 315 (O'Mahoney & Kennedy), introduced in Senate January 14; H. R. 2528 (Donohue), introduced in House January 15; H. R. 2788 (Osmers), introduced in House January 19; and H. R. 2868 (Donohue), introduced in House January 20; to Committee on the Judiciary. Similar to H. R. 848.

**PRICE DISCRIMINATION ENFORCEMENT:** H. R. 2977 (Celler), a bill to amend section 11 of the Clayton Act to provide for the more expeditious enforcement of cease and desist orders issued thereunder, and for other purposes, introduced in House January 21; also S. 714 and S. 726 intro-

duced in Senate January 27; all to Committee on the Judiciary. Similar to H. R. 2977.

**PRICE DISCRIMINATION ACTIONS FOR DAMAGES FOR VIOLATIONS:** H. R. 212 (Patman), a bill to amend the Clayton Act so as to supplement existing laws against unlawful restraints and monopolies by providing that violations of the Robinson-Patman Act shall constitute violations of the antitrust laws; introduced in House January 7. Also S. 725 (Sparkman and 10 other Senators) introduced in Senate January 27. Similar to H. R. 212; to Committee on the Judiciary.

**PRICE-QUALITY STABILIZATION:** H. R. 3187 (Madden), a bill to amend the Federal Trade Commission Act to promote quality and price stabilization; to the Committee on Interstate and Foreign Commerce; introduced in House January 22. Similar to H. R. 2463 previously introduced.

**SALMON IMPORTS RESTRICTED:** H. R. 3063 (Rivers of Alaska), a bill to facilitate the application and operation of the Fish and Wildlife Act of 1956, and for other purposes; to the Committee on Merchant Marine and Fisheries; introduced in House January 21. Also S. 502 (Magnuson), introduced in Senate January 20; to Committee on Interstate and Foreign Commerce. Similar to H. R. 605 and other bills previously introduced. Would prohibit the import of salmon products derived from fish caught by nationals of any country that permits fishing for salmon by gill nets on the high seas at times and places where occur large quantities of immature salmon of North American origin.

**SHIP MORTGAGE INSURANCE AMENDMENTS OF 1959:** S. 555 (Butler), a bill to amend title XI of the Merchant Marine Act, 1936, in order to provide mortgage and loan insurance for the construction, reconstruction, or reconditioning of vessels in shipyards in the continental United States; introduced in Senate January 20; also H. R. 3169 (Garmatz) introduced in House January 22; both to Committee on Interstate and Foreign Commerce. The bill would extend mortgage and loan insurance to foreign-flag vessels constructed or repaired in United States shipyards. Under the present law the Maritime Administration insures mortgages only on ships constructed for United States-flag registry. Among the different types of vessels included would also be vessels "in the fishing trade or industry."

**SMALL BUSINESS TAX RELIEF:** H. R. 2812 (Wolf), a bill to provide a program of tax adjustment for small business and for persons engaged in small business; also H. R. 3012 (Hiestand) introduced in House January 31; H. R. 3839 (Bass of New Hampshire) introduced in House February 2; and H. R. 4043 (Rhodes of Arizona) introduced in House February 4; all to Committee on Ways and Means. Similar to H. R. 2 and other bills previously introduced.

**STARFISH ERADICATION IN LONG ISLAND SOUND:** S. 941 (Bush and Javits), a bill to provide that the Secretary of the Interior shall develop and carry out an emergency program for the eradication of starfish in Long Island Sound and adjacent waters; to the Committee on Interstate and Foreign Commerce; introduced in Senate Feb-

February 4. Also H. R. 4019 (Forand); to the Committee on Merchant Marine and Fisheries; introduced in House February 4. Similar to H. R. 1984 and H. R. 3087 previously introduced.

**SURPLUS FISHERY PRODUCTS FOR EXPORT:** S. 580 (Magnuson & Jackson), a bill to provide that certain surplus fishery products may be exported under the Agricultural Trade Development and Assistance Act of 1954; to the Committee on Agriculture and Forestry; introduced in Senate January 20. Includes herring oil and other fish oil, and other fishery products produced in Alaska or elsewhere in the United States.

**TRADE ADJUSTMENT ACT OF 1959:** H. R. 2475 (Donohue), a bill to provide assistance to communities, industries, business enterprises, and individuals to facilitate adjustments made necessary by the trade policy of the United States; to the Committee on Ways and Means; introduced in House January 15.

**UNEMPLOYMENT RELIEF IN DEPRESSED AREAS:** H. R. 454 (Zelenko), a bill to establish an effective program to alleviate conditions of excessive unemployment in certain economically depressed areas; to Committee on Ways and Means; introduced in House January 7. Provides for Federal aid to economically depressed areas through loans for industrial projects, grants for construction of public facilities, technical development assistance, loans and grants for urban renewal and financial aid for the vocational retraining of unemployed workers. President Eisenhower vetoed similar depressed area legislation introduced in 1958.

Also H. R. 1024 (Morgan), H. R. 1211 (Bailey), and H. R. 1255 (Hechler) introduced in House Jan-

uary 7; H. R. 2871 (Denton) introduced in House January 20; H. R. 2969 (Bowles) introduced in House January 21; H. R. 3146 (Byrne of Pennsylvania) introduced in House January 22; H. R. 3448 (Blatnick), H. R. 3450 (Bowles), H. R. 3451 (Brade-mas), H. R. 3466 (Flood), H. R. 3504 (Slack), H. R. 3505 (Spence), introduced in House, and S. 722 (Douglas and 38 other Senators) introduced in Senate on January 27; H. R. 3622 (Edmondson), H. R. 3642 (Gray), and H. R. 3698 (Stratton) introduced in House January 29; H. R. 3849 (Dent), H. R. 3875 (Roosevelt), H. R. 3902 (Flynn), and H. R. 3906 (Kowalski) introduced in House February 2; H. R. 3966 (Carnahan) introduced in House February 3; H. R. 4027 (Mrs. Kee), H. R. 4048 (Wampler), and H. R. 4096 (Staggers) introduced in House February 4; all to Committee on Banking and Currency; all similar to H. R. 71.

S. 268, previously listed, was referred to Committee on Banking and Currency instead of Committee on Ways and Means.

**WAGES:** H. R. 3204 (Santangelo), a bill to amend the Fair Labor Standards Act of 1938 so as to increase the minimum hourly wage from \$1 to \$1.25, introduced in House January 22; also H. R. 3270 (Bennett of Michigan) introduced in House January 26, and H. R. 3769 (Vanik) introduced in House January 29; all to Committee on Education and Labor. Similar to H. R. 83 and other bills previously introduced.

**WAGES:** H. R. 3865 (Kearns), a bill to amend the Fair Labor Standards Act of 1938, as amended, to provide for review by the Secretary of Labor of the minimum wage recommendations of industry committees; to the Committee on Education and Labor; introduced in House February 2.



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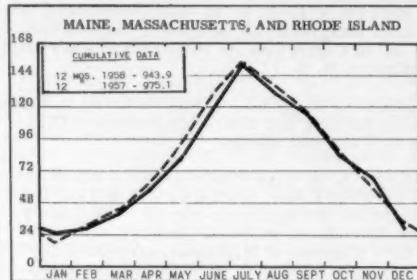
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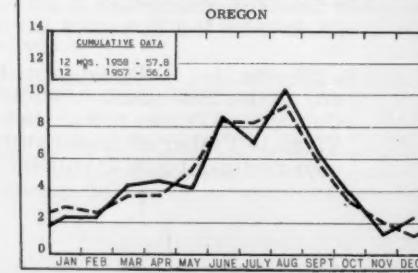
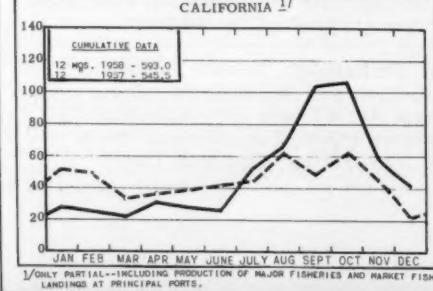
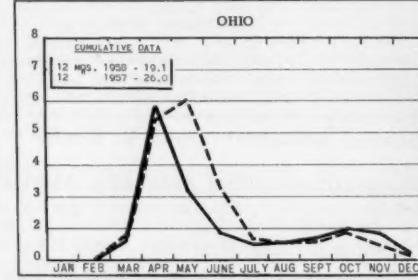
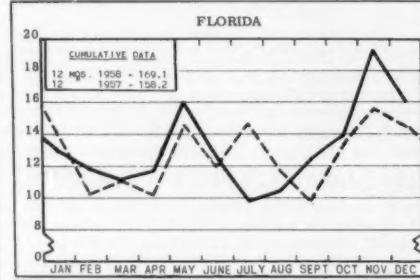
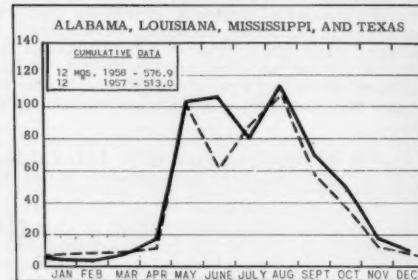
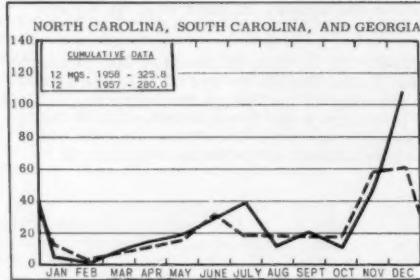
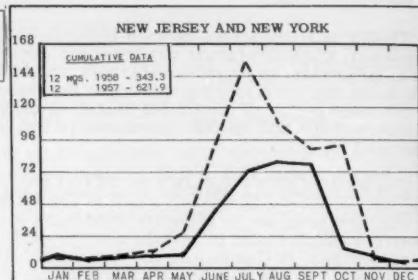
P. 20--fig. 1 - F. B. Sanford, Branch of Technology, Seattle, Wash.; pp. 38-40, Biological Laboratory, U. S. Fish and Wildlife Service, Galveston, Texas; p. 43--Bob Munns; pp. 46, 47, and 50--Bob Bailey, Virginia Fisheries Laboratory, Gloucester Point, Va.; Outside back cover--figs. 1 and 2--Albert Harris & Associates, Oakland, Calif.

# FISHERY INDICATORS

**CHART I - FISHERY LANDINGS for SELECTED STATES**  
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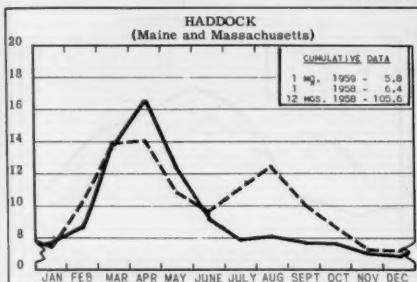


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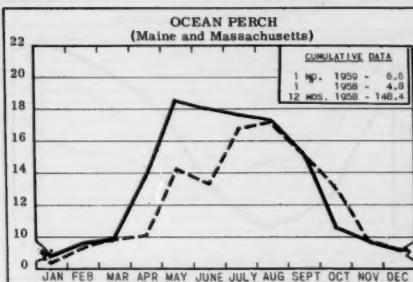


## CHART 2 - LANDINGS for SELECTED FISHERIES

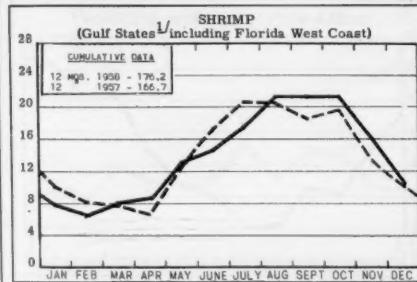
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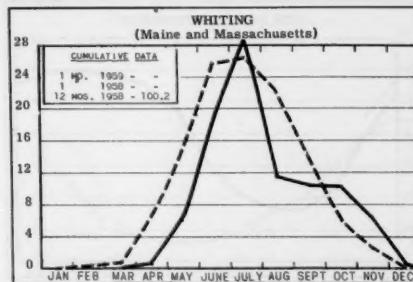
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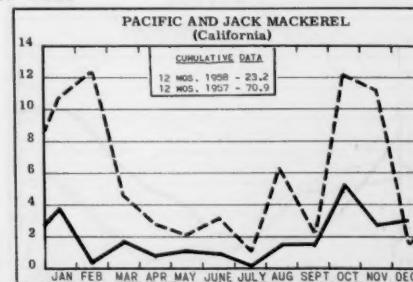
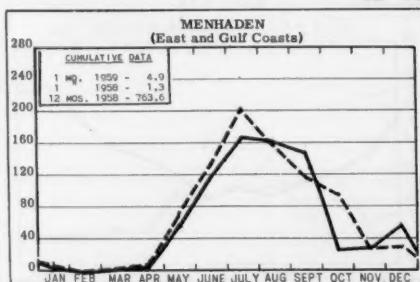
In Millions of Pounds



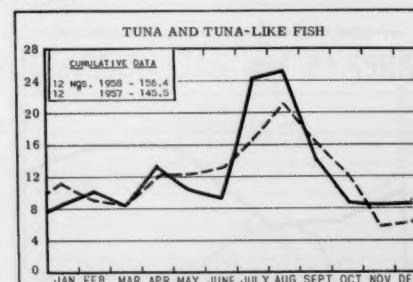
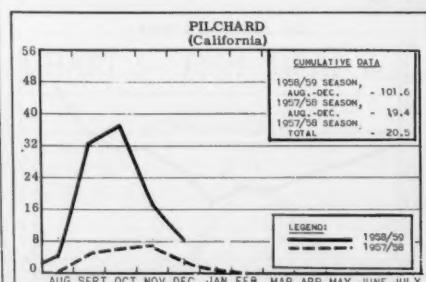
<sup>1/</sup>LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.



In Thousands of Tons

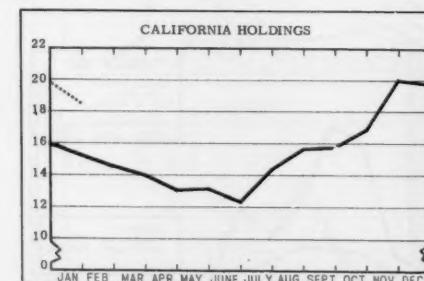
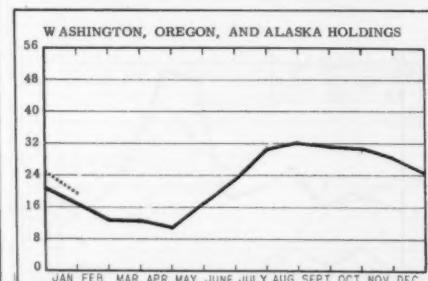
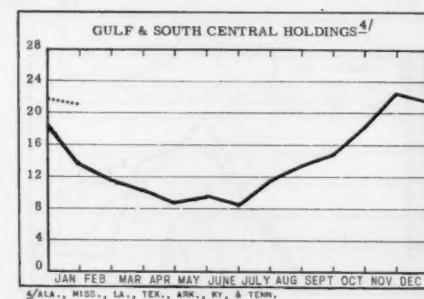
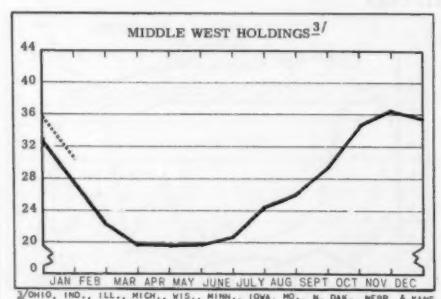
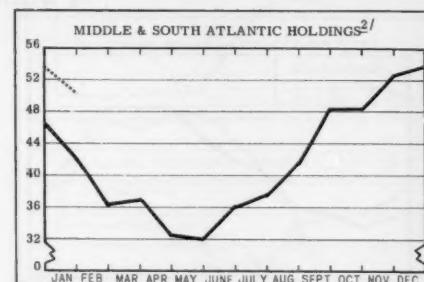
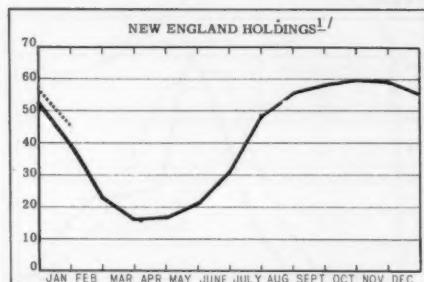
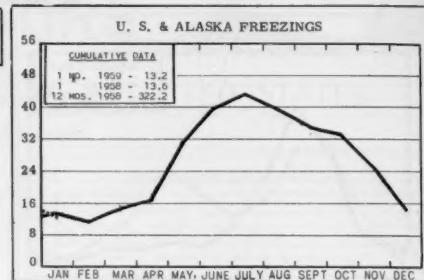
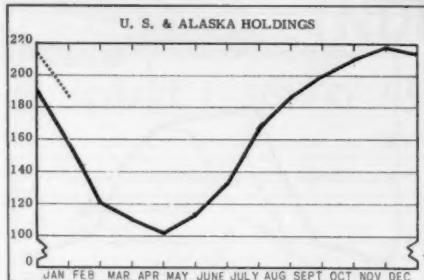


In Thousands of Tons



### CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS \*

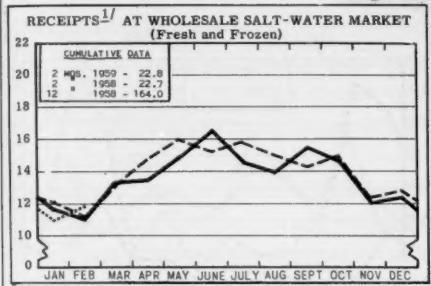
In Millions of Pounds



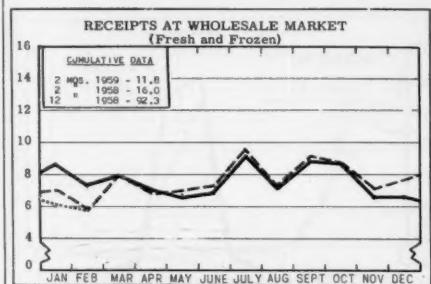
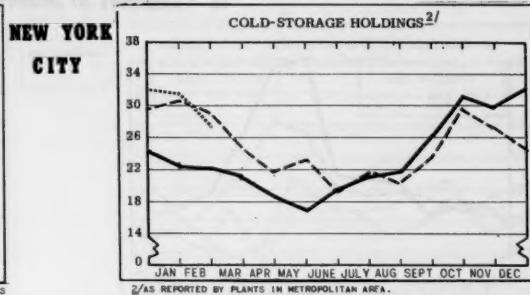
\* Excludes salted, cured, and smoked products.

## CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

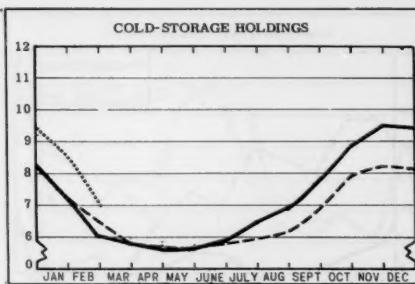
In Millions of Pounds



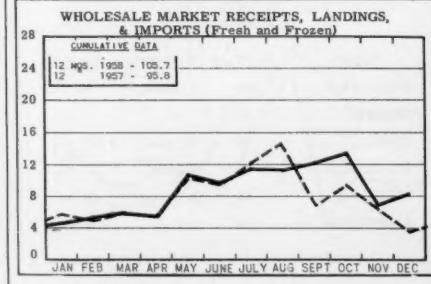
<sup>1/</sup>INCLUDE TRUCK AND RAIL IMPORTS FROM CANADA AND DIRECT VESSEL LANDINGS AT NEW YORK CITY.



CHICAGO

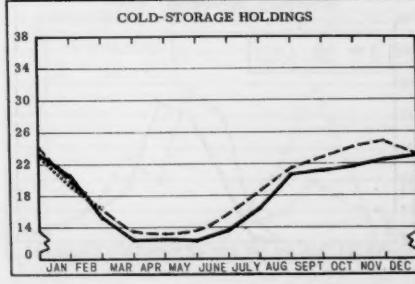


SEATTLE

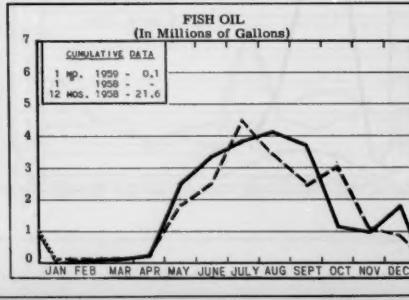
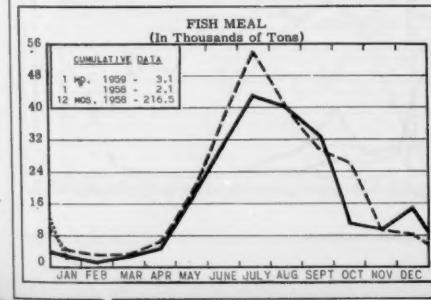


LEGEND:  
1959  
1958  
1957

BOSTON

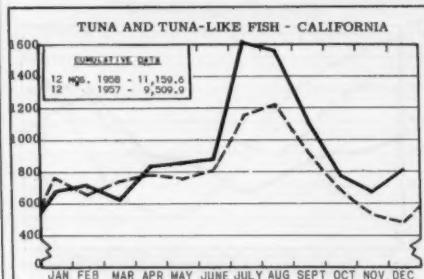


## CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

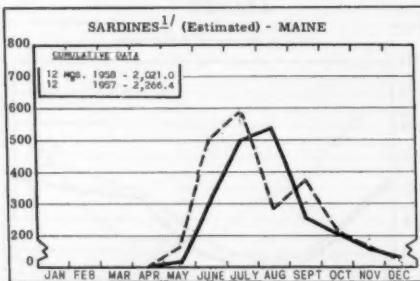
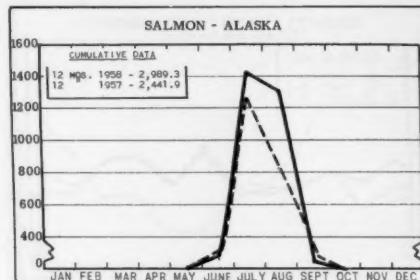
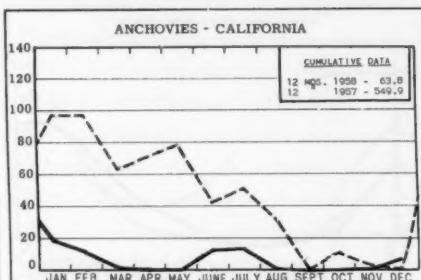
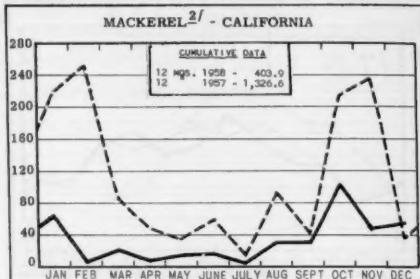


## CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

**In Thousands of Standard Cases**

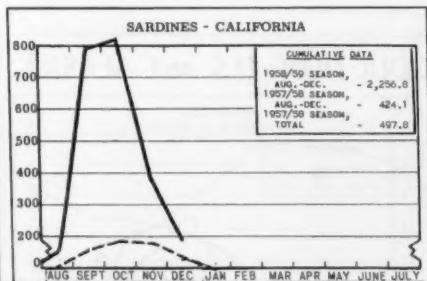


**LEGEND:**  
— 1958  
- - - 1957

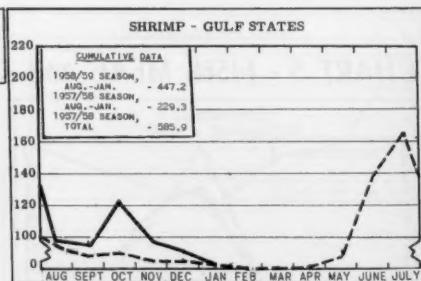


**STANDARD CASES**

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	½ drawn	3½ oz.
SHRIMP.....	48	--	5 oz.
TUNA.....	48	# ½ tuna	6 & 7 oz.
PILCHARDS...	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	½-lb.	8 oz.

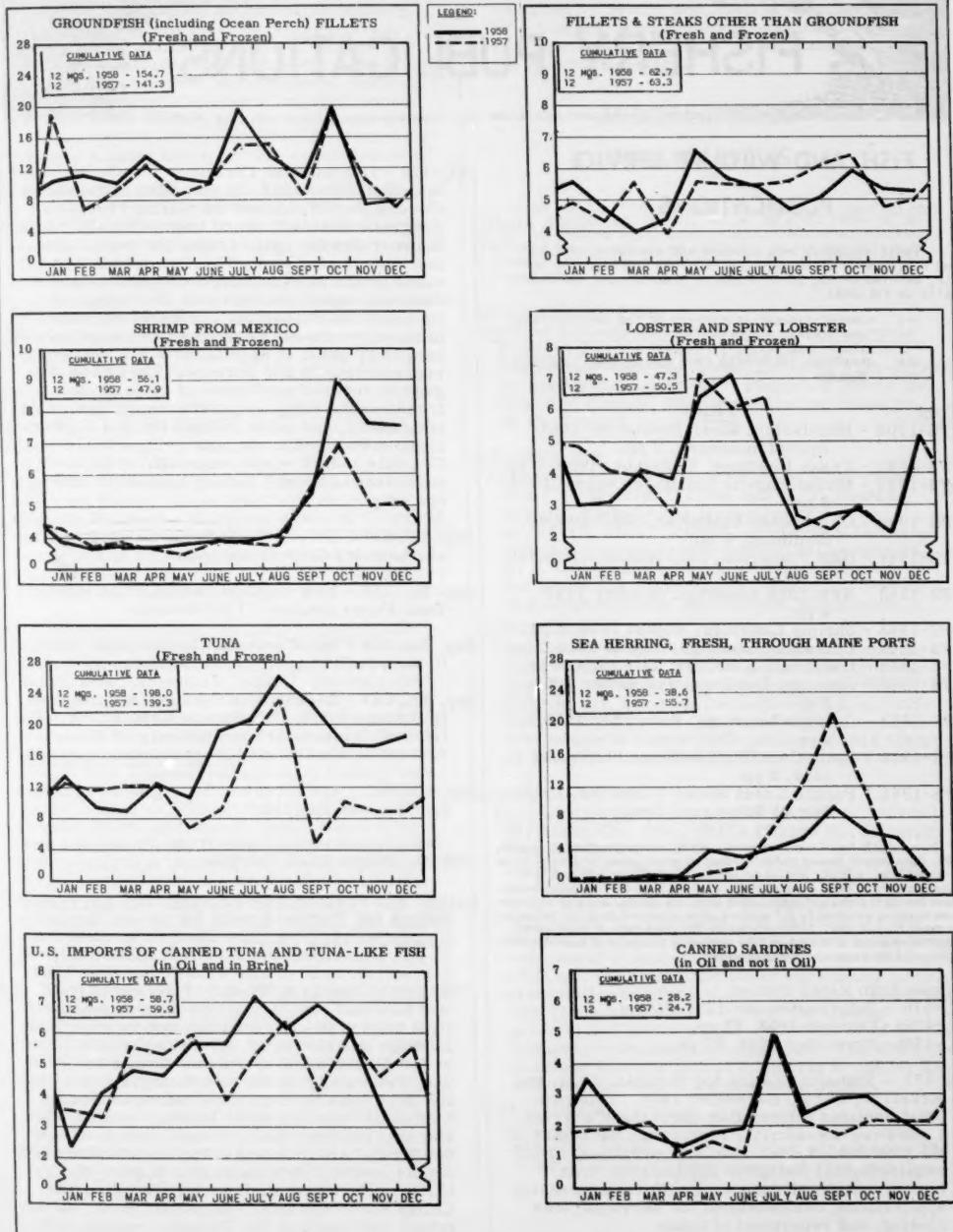


**Legend:**  
— 1958/59  
- - - 1957/58



## CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

**In Millions of Pounds**



# RECENT FISHERY PUBLICATIONS

## FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
- FL - FISHERY LEAFLETS.
- SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

Number	Title
CFS-1908 - Mississippi River Fisheries, 1957	Annual Summary, 7 pp.
CFS-1922 - Texas Landings, September 1958, 3 pp.	
CFS-1938 - Massachusetts Landings, August 1958,	5 pp.
CFS-1940 - Chesapeake Fisheries, 1957 Annual	Summary, 6 pp.
CFS-1941 - Gulf Fisheries, 1957 Annual Summary,	11 pp.
CFS-1942 - New York Landings, October 1958,	4 pp.
CFS-1943 - Shrimp Landings, August 1958, 6 pp.	
CFS-1945 - Louisiana Landings, August 1958, 2 pp.	
CFS-1948 - California Landings, July 1958, 4 pp.	
CFS-1949 - Alabama Landings, September 1958,	2 pp.
CFS-1952 - Georgia Landings, November 1958,	2 pp.
CFS-1954 - South Carolina Landings, November	
	1958, 2 pp.
CFS-1961 - Pacific Coast States Fisheries, 1957	
	Annual Summary, 6 pp.

In a series to be released covering a survey continuing through June 30, 1959, these reports present statistical data on retail prices for several types of canned tuna, salmon, and Maine sardines. Data are gathered in 51 cities, grouped in three classes according to population. Separate average prices for chain stores and independent stores are shown, together with city average prices weighted by the relative sales volume of chain and independent stores in each city. Included also are the percentage of chain-store weight represented in the prices, the number of independent store prices obtained, and the range of individual prices.

- Canned Fish Retail Prices:**  
**FL-476 - July-September 1958, 70 pp.**  
**FL-476a - October 1958, 27 pp.**  
**FL-476b - November 1958, 27 pp.**

- FL-477 - Fisheries Loans for Vessels, Gear, and Research, 10 pp., December 1958.** This pamphlet contains information about the Fisheries Loan Program administered by the Secretary of the Interior. It describes loan purposes, credit requirements, ineligible applications, loan terms, collateral, loan applications, processing applications, compensation for services, loan closing, and repayment of loans.

**FL-478 - Canned Fish Consumer Purchases, October-November 1958, 32 pp., illus., processed.** Covers part of a broad marketing research program directed toward improving and expanding markets for canned tuna, canned salmon, and canned sardines. The data, which are provided by the Market Research Corporation of America under contract with the Bureau of Commercial Fisheries, represent estimates of national purchases projected from a nationwide consumer panel of approximately 6,000 families representing 22,000 persons. They show the general level of purchases of each product, trends in the range of purchases, prices paid by consumers, and other related factors of interest to those engaged in the marketing of these items. The data in this report represent estimated purchases of canned fish by household consumers only.

**Sep. No. 537 - Divers Study Behavior of Starfish and Industry Control Methods.**

**Sep. No. 538 - New England Commercial Bluefin Tuna Purse Seining - 1958 Season.**

**Sep. No. 539 - Salt Content of Eviscerated Haddock Frozen in Sodium-Chloride Brine.**

**Sep. No. 540 - Research in Service Laboratories (February 1959): "Technical Note No. 50 - Effects of Temperature and Salinity on Ciliary Activity in the Oyster (*Crassostrea virginica*)."**

**Sep. No. 541 - Spawning and Setting in Long Island Sound, Summer 1958.**

THE FOLLOWING SERVICE PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED

**Halibut and Troll Salmon Landings and Ex-Vessel Prices for Seattle, Alaska Ports, and British Columbia, 1957-1958,** by Charles M. Reardon, 33 pp., processed, January 1959. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) The first part of this biannual report contains data on Seattle troll salmon prices, landings and receipts and landings and ex-vessel prices for troll salmon at the Alaska ports of Juneau, Ketchikan, Pelican, Petersburg, Sitka, and Wrangell. The second part includes statistical tables on Seattle halibut ex-vessel prices, landings and receipts and also landings and ex-vessel prices of halibut for the Alaska ports. The last section of the report includes data on Prince Rupert, B. C., halibut prices and landings for Canadian and United States vessels; Vancouver, B. C., halibut prices and landings for Canadian vessels only;

and troll salmon and halibut landings and receipts at principal Pacific ports.

California Fishery Products Monthly Summary, November 1958, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, sardines, mackerel, and anchovies; pack of canned tuna, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, San Diego, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association tuna auction sales; for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, December 1958, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf states shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, December 1958, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the month indicated.

New England Fisheries--Monthly Summary, December 1958, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for November 1958, 19 pp. (Market News Service, 155 John St., New York 38, N. Y.) Includes receipts by species by states and provinces and methods of transportation; states and provinces by species and methods of transportation; totals by species with comparisons, for salt-water finfish, and shellfish. Also contains frozen fishery products prices by primary wholesalers; and imports of selected fishery products; for the month indicated.

(Seattle) Monthly Summary - Fishery Products, November 1958; December 1958; 6 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Ore.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the months indicated.

## MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

### ANADROMOUS FISH:

Stream Ecology and Production of Anadromous Fish, by Ferris Neave, 6 pp., illus., printed. (Reprinted from The Investigation of Fish-Power Problems, pp. 43-48.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

### ANTIBIOTICS:

"Antibiotics for the Preservation of Food Products," by Harold T. Cook and W. T. Pentzer, article, Agricultural Marketing, vol. 4, no. 1, pp. 16-17, illus., printed, single copy 15 cents. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C.

### AUSTRALIA:

"The Status of the 'White' Crayfish in Western Australia," by R. W. George, article, Australian Journal of Marine and Freshwater Research, vol. 9, no. 4, December 1958, pp. 537-545, illus., printed. Commonwealth Scientific and Industrial Research Organization, 314 Albert St., East Melbourne, C. 2, Victoria, Australia.

### BURMA:

Deep Sea Fishing in Burma, 13 pp., illus., printed. Martaban Co., Ltd., 49/53 Phayre St., Rangoon, Burma, January 1958. A report of the Burma-Japan Deep Sea Fishing Joint Venture, formed in August 1953 under the name of Martaban Co., Ltd. The venture, under the guidance of the Ministries of Industries, and Agriculture and Forest, has as its aims, among others, the development of self-sufficiency in marine food-stuff and the establishment of subsidiary industries such as fish meal and fertilizer. Several charts showing the location of the fishing grounds and tables on the performance of the Company's trawlers are included. The authors conclude that sea fish is beginning to assert itself into the diet of the Burmese people.

### CALIFORNIA:

California Fish and Game, vol. 45, no. 1, January 1959, 64 pp., illus., printed, single copy 75 cents. California Department of Fish and Game,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

722 Capitol Avenue, Sacramento 14, Calif. Contains, among others, the following articles: "A Review of the Lingcod, *Ophiodon elongatus*," by J. B. Phillips; and "The Systematics and Distribution of Crayfishes in California," by J. A. Riegel.

"Status of the Animal Food Fishery in Northern California, 1956 and 1957," by E. A. Best, article, California Fish and Game, vol. 45, no. 1, January 1959, pp. 5-18, illus., printed, single copy 75 cents. Department of Fish and Game, 722 Capitol Avenue, Sacramento 14, Calif. According to this report, the annual utilization of trash fish for animal food in northern California has increased sixfold since this industry began in 1952, and is now using in excess of three million pounds of whole fish each year. It also utilizes an additional eight million pounds of fish carcasses annually. The author states that "At the present time the animal food fishery is doing no harm to the established fisheries. The fish that are the raw material for this industry are those which were formerly discarded at sea. No fishery has developed solely for the purpose of supplying this industry. The existing fleet of market fishermen is using the animal food industry as a means of supplementing income by utilizing a resource that formerly was discarded as a waste product of the fishing operations."

#### COMMON MARKET:

"Les Problemes Poses par l'Entree en Vigueur du Marche Commun Europeen" (The Problems Caused by the Activation of the European Common Market), article, La Peche Maritime, vol. 37, no. 969, December 1958, pp. 745-750, illus., printed. La Peche Maritime, 190 Boulevard Haussmann, Paris, France.

#### CANNING:

"Canning Export-Type Bonito by the Solid Pack Method," by Fehmi Ersan, article, Balkik ve Balkikcilik (Fish and Fishery), vol. VI, no. 10, October 1958, pp. 18-20, illus., printed in Turkish. Et ve Balkik Kurumu, Istanbul, Turkey.

#### ECHO-SOUNDING:

Echo-Sounder Surveys in the Autumn of 1956, by D. S. Tungate, Fishery Investigations, Series II, vol. XXII, no. 2, 18 pp., illus., printed, \$1.40. Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1958. This report describes a series of five echo-sounder surveys carried out on the East Anglian grounds in order to aid the fleet in locating larger herring shoals. Detailed nautical charts are included, depicting the fish densities by areas and dates.

#### ELECTRICAL FISHING:

"La Peche Electrique en Allemagne" (Electrical Fishing in Germany), article, La Peche Maritime, vol. 37, no. 969, December 1958, pp. 819-821, illus., printed. La Peche Maritime, 190 Boulevard Haussmann, Paris, France.

#### EUROPE:

Die Wirtschaftliche Bedeutung der Seefischerei Nordeuropas (The Economic Meaning of the Sea

Fisheries of Northern Europe), by Fritz Bartz, 81 pp., illus., printed in German, DM23.40 (US\$5.60). (Reprinted from Handbuch der Seefischerei Nordeuropas, vol. X, no. 9.) E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart W, Germany, 1958.

#### FISHERY REGULATIONS:

Some Principles Involved in Regulation of Fisheries by Quota, by W. E. Ricker, 6 pp., printed. (Reprinted from the Canadian Fish Culturist, no. 22, May 1958.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

#### FISHING VESSELS:

Bau und Seeverhalten von Fischereifahrzeugen (Construction and Seaworthiness of Fishing Vessels), by W. Mockel, 88 pp., illus., printed in German, DM34.80 brosch (US\$8.40). (Reprinted from Handbuch der Seefischerei Nordeuropas, vol. XI, no. 5.) E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart W, Germany, 1958.

#### FOREIGN TRADE:

"United States Foreign Trade Policy" (A Review Article), by J. M. Letiche, article, The American Economic Review, vol. XLVIII, no. 5, December 1958, pp. 954-966, printed, single copy \$1.50. The American Economic Association, 450 Ahnaip St., Menasha, Wis.

#### FRANCE:

France Peche, vol. 3, no. 23, Special Number--1958, 114 pp., illus., printed in French. France Peche, Tour Sud-Est, Rue de Guemene, Lorient, France. Contains, among others, the following articles: "The Importance of Sea-Fishing in French National Economy," by Gilbert Grandval; "The Place of the Fishing Industry in France," "Oyster Farming in France," by Charles Herve; "Salting Down--The Curing of Herring," by Malfoy Wadoux; "French Fishing Boats;" and "Fishing and the World Food Position," by J. Girard.

#### FRESH-WATER FISH:

"Fresh Water Fish for the Pacific," by H. Van Pel, article, SPC Quarterly Bulletin, vol. 8, no. 4, October 1958, pp. 48-49, illus., printed, single copy 30 U. S. cents. South Pacific Commission, Noumea, New Caledonia. The endemic fish populations of streams, rivers, lakes, and ponds in the South Pacific are sparse. Because the human diet in this region is often deficient in the protein that fish can provide, the possibilities of stocking both natural and artificial bodies of water are being explored. This article records observations on recent introductions of eight species of fresh-water fish; as well as on other new species now undergoing trials in the South Pacific Commission's ponds in New Caledonia. Considerable success has been achieved with the tilapia, which thrives in the tropics, is quite prolific, and adapts itself remarkably well to brackish or salt water.

#### GENERAL:

Contribution of Biology and Oceanography to Increased Harvest of Marine Fishes, by C. P. Idyll,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Contribution No. 204, 11 pp., printed. (Reprinted from Transactions of the American Fisheries Society, vol. 87, 1957.) The Marine Laboratory, University of Miami, Miami, Fla., 1958.

A Field and Laboratory Investigation of Fish in a Sewage Effluent, by I. R. H. Allan, D. W. M. Herbert, and J. S. Alabaster, Ministry of Agriculture, Fisheries and Food Fishery Investigations, Series I, vol. VI, no. 2, 85 pp., illus., printed. Her Majesty's Stationery Office, London, England, 1958.

The Impenetrable Sea, by Arthur Constance, 279 pp., illus., printed, \$4. Citadel Press, 222 4th Ave., New York 3, N. Y. On the wonders of the sea, of winds, whirlpools, coastlines, whales, and plankton.

Improved Methods among Wholesale Food Distributors (For Inventory Control, Sales Accounting, and Shipment of Merchandise), Marketing Research Report No. 271, 75 pp., illus., processed, 40 cents. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.) U. S. Department of Agriculture, Agricultural Marketing Service, Washington, D. C. Although this report on improved methods among wholesale food distributors is not specifically for fishery wholesalers, some of the ideas are applicable.

Marking and Regeneration of Fins, by T. A. Stuart, Scottish Home Department Fresh-water and Salmon Fisheries Research No. 22, 17 pp., illus., printed, 5s. (70 U. S. cents). Her Majesty's Stationery Office, Edinburgh, Scotland.

Sustenance from the Sea, by F. G. Walton Smith, Energy Resources Conference, Denver, Colo., October 15, 1958, 7 pp., processed. The Marine Laboratory, University of Miami, Miami, Fla. Our exploding populations today make mandatory the exploration of all possible sources of food. The sea, potentially, has a capacity for providing about ten times as much food as the land could possibly grow under the most favorable conditions. Growth of fish over the entire ocean has been estimated at two billion tons annually, but the actual world catch of fish is only about 26 million tons. New fishing methods, unexplored areas for fishing, and even use of new species of fish are needed.

#### GULF OF PANAMA:

Some Aspects of Upwelling in the Gulf of Panama, by Milner B. Schaefer, Yvonne M. M. Bishop and Gerald V. Howard, 56 pp., illus., printed in English and Spanish. (Reprinted from Inter-American Tropical Tuna Commission Bulletin Vol. III, No. 2, pp. 79-132.) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1958.

#### HALIBUT:

Regulation and Investigation of the Pacific Halibut Fishery in 1957, Report of the International Pacific Halibut Commission No. 26, 16 pp., illus., printed. International Pacific Halibut Commission, Seattle, Wash., 1958. A brief report of activities of the Commission during 1957 which discusses the historical background of the Com-

mission, the 1957 regulations, statistics of the fishery, catch per unit fishing effort, length of fishing seasons, composition of the catches, growth studies, tagging experiments, and studies of subcommercial size halibut.

#### HERRING:

The Fecundity of Pacific Herring (CLUPEA PAL-LAS) in British Columbia Coastal Waters, by Fuzuko Nagasaki, 18 pp., illus., printed. (Reprinted from the Journal of the Fisheries Research Board of Canada, vol. 15, no. 3, 1958, pp. 313-330.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

Population Studies on Juvenile Herring in Barkley Sound, British Columbia, by Alan S. Hours-ton, 52 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 5, 1958, pp. 909-960.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

#### INTERNATIONAL COMMISSIONS:

International Commission for the Northwest Atlantic Fisheries, Annual Proceedings for the Year 1957-58, vol. 8, 106 pp., illus., printed. International Commission for the Northwest Atlantic Fisheries, Halifax, Nova Scotia, Canada, 1958. This bulletin presents the administrative report of the Commission for the year ending June 30, 1958, including financial statements; a report of the Eighth Annual Meeting of the Commission, June 9-14, 1958; summaries of research during 1957 broken down by country; and a compilation of research reports by subareas for 1957.

#### JAPAN:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 9, no. 2, pp. 89-148, plates, illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hakodate, Japan, August 1958. Contains, among others, the following articles: "On the Decrease of Buoyant Force of the Float--II," by Shuzo Igarashi; "On the Trawl Fishing Ground Off the West Coast of the Kamchatka Peninsula," by Tatsuzaki Maeda; "Velocity of Invasion of Bacteria from the Point of the Slime ('Neto') Formed on the Surface of the Fish Jelly Product ('Kamaboko')," by Eiichi Tanikawa and Yutaka Fujii; and "Studies on the Complete Utilization of Squid (Ommastrephes sloani pacificus). XVII--On the 'Flat Sour' of Canned Squid Meat," by Eiichi Tanikawa and Yoshio Nagasawa.

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 9, no. 3, pp. 149-257, illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hakodate, Japan, November 1958. Contains, among others, the following articles: "Lipids from the Liver of Octopus dofleini. I--Composition of Fatty Acids of Acetone-Soluble Lipid," by Mutsuo Hatano; "Lipids from the Liver of Octopus dofleini. II--On the Lower Fatty Acids of Acetone-Soluble Lipid," by Mutsuo Hatano; "Structure of the Waters in the Bering Sea and the Aleutian Region," by Hideto Koto and Takeji Fujii; "Quality of Flatfish from Hakodate. I--Flat-

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fish from Hakodate--from the Viewpoint of Study of Merchandise, not from the Biology," by Keiichi Oishi; "Quality of Flatfish from Hakodate. 2--Evaluation of the Quality," by Keiichi Oishi; and "Studies on the Muscle Meat of Paralithodes camtschatica (Til.)-(I)--Alaska King Crab," by Eiichi Tanikawa, Tetsuro Wakasa, and Yoshio Nagasawa.

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#### LINGCOD:

Mortality Rates and Estimates of Theoretical Yield in Relation to Minimum Commercial Size of Lingcod (OPIPHODON ELONGATUS) from the Strait of Georgia, British Columbia, by Bruce M. Chatwin, 19 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 5, 1958, pp. 831-849.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

#### LOBSTERS:

"La Langosta Blanca de Mauritania: Su Industrialización" (Mauritania's White Spiny Lobster--Its Industry), by Miguel Massuti Oliver, article, Industrias Pesqueras, vol. XXXII, no. 756, October 15, 1958, p. 13, printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo, Spain.

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Maximum Sustained Yields from Fluctuating Environments and Mixed Stocks, by W. E. Ricker, 16 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 5, 1958, pp. 991-1006.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

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Perspectives in Marine Biology, edited by A. A. Buzzati-Traverso, 620 pp., printed, \$10. University of California Press, Berkeley 4, Calif. Consists of 41 papers and round-table discussion presented at a Scripps Institution of Oceanography symposium in 1956.

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Journal du Conseil, vol. XXIV, no. 1, 208 pp., illus., printed, single copy Kr. 16 (US\$2.32). Messrs. Andr. Fred. Høst & Søn, Bredgade, Copenhagen, Denmark, November 1958. Among the articles presented in this journal are the following: "Description of Model Used to Demonstrate Dynamics of Exploited Fish Stocks," by I. D. Richardson and J. A. Gulland; "An Analysis of the Variability Associated with the Vigneron-Dahl Modification of the Otter Trawl by Day and by Night and a Discussion of Its Action," by T. B. Baggenal; "An Analysis of the Method of Sampling

the East Anglian Herring Catches," by A. C. Burd; "Estimation of the Stock Strength of the Norwegian Herring," by Olav Aasen; "On the Causes of the Poor Catches of Baltic Herring on the Finnish Coast in the Summer of 1956," by Veikko Sjöblom; "On the Appearance of Rings on Herring Scales," by R. Muzinic and I. D. Richardson; and "Some Seasonal Variations in the Catch and Stock Composition of the Lobster," by H. J. Thomas.

#### MUSSELS:

The Winter Feeding of the Oystercatcher (HAEMATOPOUS OSTRALEGUS) on the Edible Mussel (MYTILUS EDULIS) in the Conway Estuary, North Wales, by R. E. Drinnan, Fishery Investigations, Series II, vol. XXII, no. 4, 17 pp., illus., printed, 56 U. S. cents. Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1958. This study was intended to provide information which, with little local observation, would permit an estimate to be made of oystercatcher predation on any mussel-bearing area. It was found that each bird eats about its own weight of wet shellfish per day. Population samples taken through the winter of 1955/56 showed the steady removal of the larger size groups of mussels by these birds.

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Jaarcijfers Over de Visserij Gedurende Het Jaar 1957 (Annual Fisheries Statistics, 1957), Verslagen en Mededelingen van de Directie van de Visserijen No. 49, 155 pp., illus., printed in Dutch with English titles and summaries, and statistical tables in both Dutch and English. Directie van de Visserijen, 's-Gravenhage, Netherlands, 1958.

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Fiskeflaten, 1957 (The Fishery Fleet, 1957), Arsberetning Vedkommende Norges Fiskerier, 1957, no. 13, 35 pp., printed in Norwegian. John Griegs Boktrykkeri, Bergen, Norway, 1958.

"Fiskerne og Farkostene i Lofotfiske, 1958" (Fishermen and Craft in the Lofoten Fishery, 1958) by Sverre Mollestad, article, Fisks Gang, vol. 44, no. 50, December 11, 1958, pp. 654-659, illus., printed in Norwegian. Fisks Gang, Postgiro Nr. 691 81, Bergen, Norway.

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Thermocline Topography, Horizontal Currents and "Ridging" in the Eastern Tropical Pacific, by Townsend Cromwell, 32 pp., illus., printed in English and Spanish. (Reprinted from Inter-American Tropical Tuna Commission Bulletin, Vol. III, No. 3, pp. 135-164.) Inter-American Tropical Tuna Commission, La Jolla, Calif., 1958.

#### PERU:

La Industria Pesquera Peruana en 1957 (The Peruvian Fishing Industry in 1957), by Javier I. Cortez, Scientific Publication Series No. 10, 14 pp., illus., processed in Spanish. Ministerio de Agricultura, Direccion de Pesqueria y Caza, Lima, Peru, 1958. During 1957, Peru confirmed its position among the principal fishing nations

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of Latin America and maintained first place in production of fish byproducts. This report presents statistical tables on the freezing and canning of fish and shellfish, production of fish meal and oil, catch and consumption of principal species, import and export of fisheries products, and the whaling industry.

#### PHILIPPINES:

Fisheries Statistics of the Philippines, 1957, 62 pp., illus., processed. Department of Agriculture and Natural Resources, Bureau of Fisheries, Manila, Philippines. This comprehensive report is devoted to fishery production in the Philippines. The tables are grouped together under the headings (1) production, consumption, and requirement; (2) commercial fishing vessels; (3) fish ponds; (4) foreign trade; and (5) other data. Subdivision of the tables is made according to gear, kind of fish caught, monthly production, and fishing grounds. Statistics also cover reptile skins, seaweeds, sharkfins, shells, sponges, trepang, turtle eggs, and turtle shells. The appendices contain information on the fishery districts, the forms used in collecting fishery statistics, and an inventory of fishing gear used in the Philippines for the year 1953. Except for Table 1, which presents fish production data since 1946, most of the information covers the five-year period 1953-57.

#### POISONOUS FISH:

A Review of Ciguatera, Tropical Fish Poisoning, with a Tentative Explanation of Its Cause, by John E. Randall, Contribution No. 212, 32 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 8, no. 3, September 1958, pp. 236-267.) The Marine Laboratory, University of Miami, Miami, Fla.

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"La Pesca Portuguesa de Arrastre y sus Problemas" (Portugal's Trawl Fishing and Its Problems), article, Industrias Pesqueras, vol. XXXII, no. 756, October 15, 1958, pp. 6-8, printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2, Vigo, Spain.

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Capacity of Refrigerated Warehouses in the United States, October 1, 1957, CoSt-2 Prelim 58, 31 pp., illus., processed. Agricultural Marketing Service, U. S. Department of Agriculture, Washington, D. C., October 1958.

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Comparisons of the Index of Return for Several Stocks of British Columbia Salmon to Study Variations in Survival, by H. Godfrey, 18 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 5, 1958, pp. 891-908.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

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Density and Distribution of Young Sockeye Salmon (ONCORHYNCHUS NERKA) Throughout a Multi-basin Lake System, by W. E. Johnson, 22 pp., illus., printed. (Reprinted from Journal of the Fisheries Research Board of Canada, vol. 15, no. 5, 1958, pp. 961-982.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

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Implications and Assessments of Environmental Stress, by J. R. Brett, 15 pp., illus., printed. (Reprinted from The Investigation of Fish-Power Problems, pp. 69-83.) Fisheries Research Board of Canada, Biological Station, Nanaimo, B. C., Canada.

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The Sea Trout or Weakfishes (Genus *Cynoscion*) of the Gulf of Mexico, by William C. Guest and Gordon Gunter, Technical Summary No. 1, 43 pp., illus., printed, for limited distribution. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans 16, La. A summary of the data accumulated in recent years by fishery scientists on the species of sea trout present in the Gulf of Mexico. This report covers the characteristics of the family Otolithidae; distribution of the weakfishes; the life history of the speckled sea trout, *Cynoscion nebulosus*; habits of adult fish; parasitism; the commercial fishery; the sports fishery; and the life histories and utilization of the white and sand trouts.

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Boletin de Informacion del Sindicato Nacional de la Pesca (Information Bulletin of the National Fishery Syndicate), No. 1, October 1958, 24 pp., printed in Spanish. Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, 6<sup>a</sup> planta, Madrid, Spain. This is the first issue of Boletin de Informacion. It has been published by Spain's National Fishery Syndicate to replace their monthly periodical *Espana Pesquera*. The new bulletin containing news on all aspects of foreign and domestic fisheries, will also be published monthly. The Syndicate plans to distribute the bulletin widely and free of charge. This could not be done with *Espana Pesquera* since it was a very elaborate and expensive-to-publish magazine.

Estadistica de Pesca, Ano 1957 (Fishery Statistics, Year 1957), 276 pp., printed in Spanish. Ministerio de Comercio, Direccion General de Pesca Maritima, Madrid, Spain. A statistical report presenting the weight and value of fish and shellfish by ports, regions, species, and months. Also contains tables on fishing gear, vessels, and canning factories.

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Economic Survey of Pla-Tu Salting Industry 1956, 90 pp., illus., printed in English with portions in

Thai. Agricultural Economics Division, Ministry of Agriculture, Bangkok, Thailand. This report comprises the first study undertaken by the Thai Fisheries Department and covers the industrial curing of this little-known but economically-important Southeast Asian fish. A detailed description is given of ownership of plants, products, source of fresh fish, credit, selling, prices, marketing costs, capital investment, labor, assistance received by salters, and assistance requested. Statistical tables on products and prices received by the salting plants are presented. The report includes a sample questionnaire on Pla-Tu salting used by the researchers in compiling these tables.

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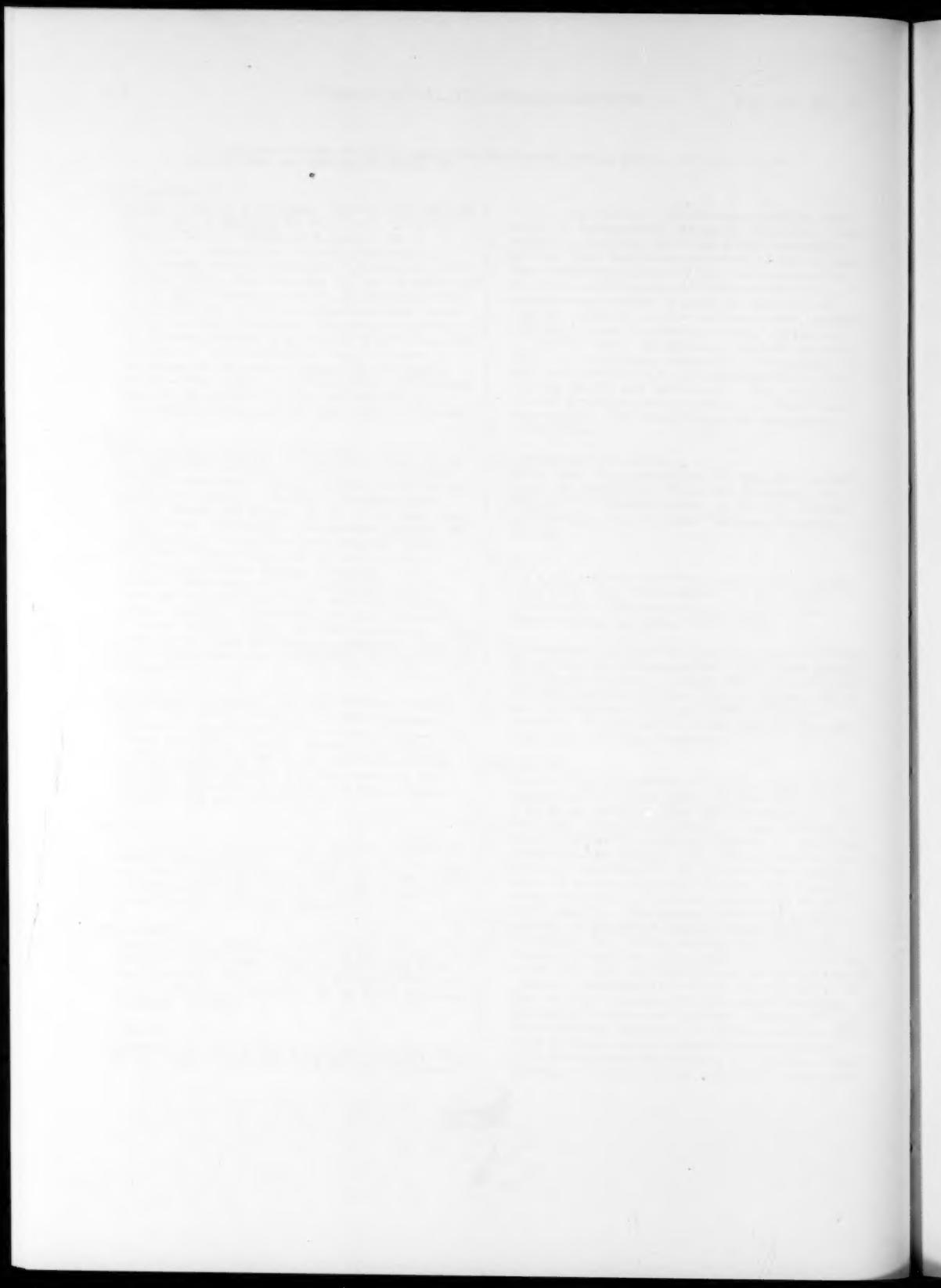
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"Natal's Whaling Industry," article, *Shell in Industry*, no. 29, September-October 1958, pp. 3-5, illus., printed. The Shell Company, P. O. Box 2231, Cape Town, Union of South Africa. A description of the whaling industry off the Natal coast of South Africa. The official whaling season in South Africa is governed by the regulations of the International Whaling Commission which restrict the sizes of whales and the period of whaling. The season for catching sperm whales off the Natal coast is from April 1 to November 30. Baleen whales may be caught during six months of the year, the period falling within the eight months allowed for taking sperm whales--generally from April 15 to October 14. The weather usually prevents whale catching during September and October. During the South African summer the whales leave for the cold southern waters where food is abundant. This article continues with a description of the sperm and baleen whales and their byproducts.







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## LARGE CHAIN STORE ANNOUNCES NEW STORE WITH SEAFOOD BUFFET

A novel method of announcing a store opening was used recently in Alameda, Calif., by a large chain store. The store, one unit in a large shopping center, is located on reclaimed land and faces San Francisco Bay. Because of its location, patrons of the shopping center must come by automobile. This and other considerations called for some realistic pioneering to acquaint Alameda shoppers with the new center. The chain store's approach to the problem was to invite officers of the 14 Councils of the Parent-Teacher Association in Alameda to be guests at a Sea-



Fig. 1 - Seafood Buffet was served in areas between frozen food cabinets.



Fig. 2 - Chef serving Filets Maryland at Seafood Buffet.

food Buffet Luncheon. Ten dishes were prepared by a well-known chef and served in the area between frozen food display cabinets.

It is reported that this "coming-out party" achieved its objective. This seems like an excellent method to introduce people to seafood dishes.

M E N U	
<p><i>Les Crevettes</i> Shrimp à la Paix, en Dill Marinade</p> <p><i>Crabe Norfolk</i> That old Virginia favorite, crab flakes Norfolk, was never better with the Chesapeake species of crab than with our own home-grown Dungeness. The flakes are lightly sautéed in paprika butter</p> <p><i>Poisson Farci à la Howard</i> Villa de la Paix's Chef Howard Johnson protects this delightful stuffed fish recipe as a "top secret" document. In those years when Howard was catering to motion picture celebrities at Hollywood's Universal City, he should have been nominated for an Oscar with this dish.</p> <p><i>Saumon Fumé</i> Wood-smoked choice and selected salmon fillets, served in paper-thin slices on Melba toast strips and lightly brushed with a touch of olive oil, lemon juice and cracked black pepper</p> <p><i>Escargots Bourgogne</i> You'll never know for sure, until you taste them. Some epicures prefer them in the shell but these are nestled in a lightly flavored garlic butter and served hot in a chafing dish.</p>	<p><i>Les Huîtres</i> Olympia petite in half-shell</p> <p><i>Saumon Rouge Glacé</i> Large red salmon, first boiled in wine with herb bouquet, then boned, skinned, chilled and covered with a sour cream-mayonnaise laced with horseradish, dry mustard and Spanish capers</p> <p><i>Sole Béchamel Soufflé en Aspic</i> A soufflé as delicate as Angel's Food moulded in aspic which requires all of the chef's artistry and skill to prepare</p> <p><i>Homard, Sauce Newburg</i> Not many hours ago, the lobster in this delicious chafing dish favorite was adventuring at the sea bottom, ten fathoms down, off Gloucester, Mass. They have been flown in, alive, in containers of fresh sea weed, for this occasion</p> <p><i>Filets de Sole au Fromage de Maryland</i> Being a creation from true Dover sole, oven poached in a careful blending of sour cream, Parmesan cheese, butter and light seasonings. Fragile, delicate, delicious!</p>

Fig. 3 - The menu tells the story of the type of dishes served at the Seafood Buffet.

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